2s. 6d.

Light and Lighting

September 1960

The delicate tracery of the ironwork in this church in Eindhoven, Holland is sharply silhouetted against the background of a bright altar illuminated to a level of 35 lm/ft² by means of 'Comptalux' 150 W floodlighting reflector lamps.

STANTON

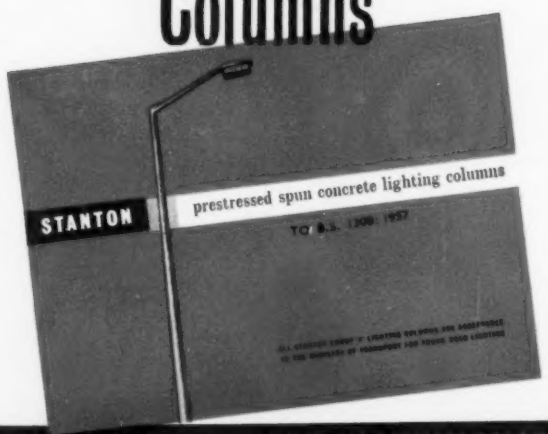
Prestressed Spun Concrete Lighting Columns

Stanton Type 8F Spun Concrete Lighting Columns at Swanwick, Derbyshire, fitted with Atlas Alpha I Sodium Lanterns.

Photograph by courtesy of F. P. Walters, Esq., Engineer, Surveyor and Water Engineer, Alfreton U.D.C.

This illustrates one of many designs approved by the Council of Industrial Design and acceptable to the Ministry of Transport for use on trunk roads.

A booklet illustrating our range of columns is available on request to the Concrete Sales Department.



THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

IN THE LIGHT OF EXPERIENCE

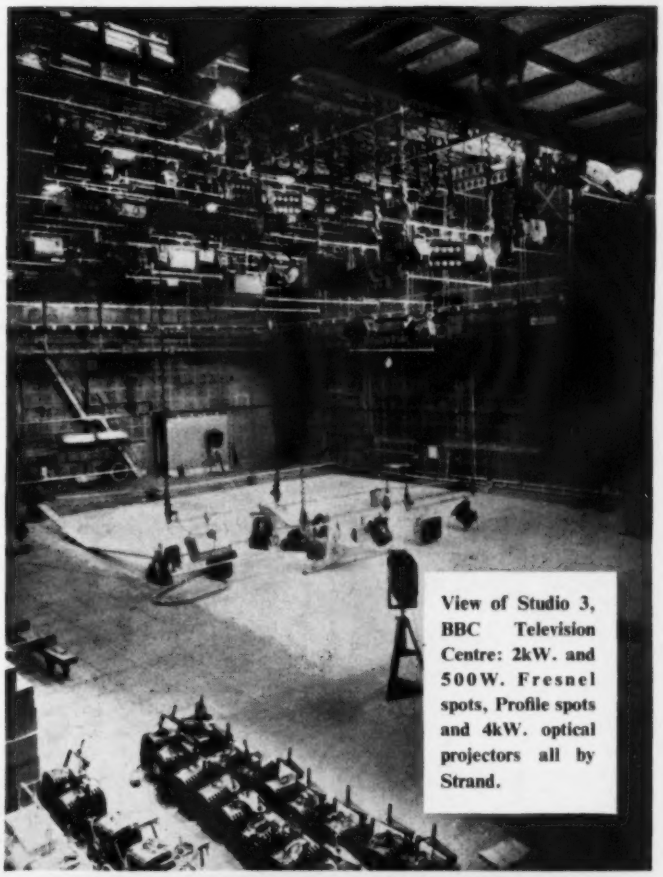
1936 BBC Alexandra Palace—the first regular definition television service in the world opened with Strand Lighting Controls.

1954 BBC Riverside Studios and Television Theatre—Strand again.

And now, in the light of twenty-four years' television experience, it's Strand again at The BBC Television Centre.

STRAND ELECTRIC

STRAND ELECTRIC & ENGINEERING CO. LTD.,
29 KING STREET, COVENT GARDEN, W.C.2.



View of Studio 3, BBC Television Centre: 2kW. and 500W. Fresnel spots, Profile spots and 4kW. optical projectors all by Strand.

A Lighting Supervisor's station at BBC Television Centre: Strand lighting control to left and right of operator with Master desk in the centre and Mimic diagram of studio outlets overhead.

LIGHTING FITTINGS

by SLR

S.L.R. ELECTRIC LTD

WELBECK WORKS, WELBECK ROAD, SOUTH HARROW, MIDDLESEX

Telephone: BYRON 3273/5

---

don't let that PROBLEM beat you . . . if it concerns the extrusion of Acrylic

Our wide experience on the extrusion of ACRYLIC diffusers can help you too! We are specialists—and our range of Industrial services cover EVOLITE ACRYLIC TUBING EXTRUDED SHEETS AND SECTIONS, also Fabricating, Moulding, Turning, and Engraving in 'PERSPEX'.

We offer only the very finest quality products, and this is backed by our guarantee to ensure your complete satisfaction.

Remember, we are pioneers in the extrusion of ACRYLIC, consult us and ycu'll be sure of an answer to your problem!

RICHARD DALEMAN LTD

325-327 LATIMER ROAD, LONDON, W10

Telephone: LADbroke 3709 & 1879

4882

(How to win friends and influence customers with the nearest thing to daylight—MAZDA °KOLOR-RITE FLUORESCENT LAMPS)

Daylight not only helps skilled workers to do "close work", it also helps to sell what they're making. It sells anything from food to fabrics, from ice-cream to ideas. Only with daylight can you be absolutely sure that what you're displaying has a fighting chance of looking "the real thing".

But what happens at night, or indoors, when there's a shortage of daylight? Easy. Now you simply buy it—in the form of the new Mazda °Kolor-rite fluorescent lamps. These lamps really are the nearest thing to daylight. And because they have the effect of bringing outdoors indoors, they enable colours to look fresh and natural. What more could you want to make any presentation vividly attractive? Be sure you're getting Mazda °Kolor-rite fluorescent lamps. *Made in 5 ft. tubes with B.C. and Bi-pin caps. Also in 4 ft. tubes with Bi-pin caps.*

°Kolor-rite

AEI
Lamp and Lighting Co Ltd

Melton Road, Leicester

The largest and most experienced designers and manufacturers of

ROAD SIGNS AND EQUIPMENT

- ROAD TRAFFIC SIGNS, ALL FINISHES
- ILLUMINATED GUARDPOSTS
- TUBULAR STEEL POSTS/COLUMNS
- LIGHTING COLUMNS
- DIRECTION ARMS
- APPROACH AND ROUTE DIRECTION SIGNS
- STREET NAMEPLATES
- BEACON GLOBES, PLASTIC
- STEEL ROAD STUDS, LINES AND LETTERS
- LETTERS AND ARROWS - PLAIN OR REFLEX
- CAST IRON ISLAND SITES
- EXTERNAL LIGHTING FITTINGS
- PORTABLE SIGNS
- "PERMAPOSTS" P.V.C. SLEEVING FOR POSTS
- REFLECTIVE SURFACE SIGNS

GOWSHALL LIMITED

A TI COMPANY

Established 1933

Head Office & Works
Rood End Road, Oldbury, Birmingham
Phone: BROadwell 2291-2
London Office & Showrooms
Lambs Conduit Passage, Red Lion Square, W.C.1
Phone: CHAncery 7042 & 7845

LUMITRON
FOR PRICE RIGHT LIGHTING

508 TM/ES/150W IS – choice of 4 colours with Louvre. 38/–

533 BC/150W with R3/L brass rims, lens and mirror finish reflector 74/8 (plus 13/6 P.T.)

VISIT OUR SHOWROOMS TODAY

565 BC/100/150W – mirror finished with Louvre. 32/8

508A SM/BC/100W – choice of 4 colours. 32/–

There are no spots on LUMITRON spotlight value

LUMITRON LTD

Manufacturers of contemporary lighting fittings.

180, Shaftesbury Avenue, London, W.C.2

Tel: COVent Garden 0126

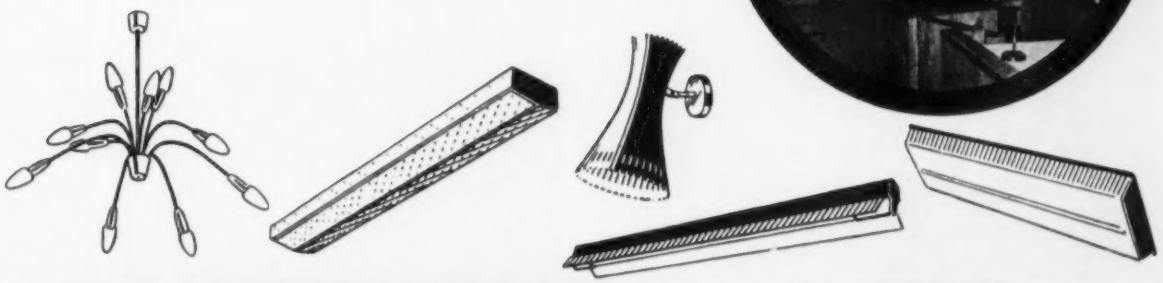
**Prices quoted are retail*

**send for fully illustrated catalogue.*

all commercial
and industrial
installations
stores, shops
offices, banks
restaurants, factories

The lighting of a store needs a different approach to the lighting of a factory. In fact every installation needs individual treatment to achieve the right effect. The Lighting Specialists offer their comprehensive service to interpret your lighting requirements and suggest the best possible scheme.

We are at your service from the supplying of a single fitting to the suggesting of a major lighting scheme.



COURTNEY, POPE

THE LIGHTING SPECIALISTS

COURTNEY, POPE (ELECTRICAL) LTD.
AMHURST PARK WORKS · Tottenham London N.15
Telephone: STAmford Hill 1270 (*fifteen lines*)

BRANCHES
10 Chatham Street, Manchester, 1. (Central 1837)
254A Corporation Street, Birmingham, 4. (Central 5852)
17 Wellington Street, Leeds, 1. (Leeds 3-4549)

Quality of Music, Harpist (Photo Fox Photos Ltd)

CRYSELCO

lamps and fittings can be obtained from any of fourteen branches and depots throughout the country.

All CRYSELCO business is based upon a policy of Quality and Service.

This attention to detail in production and distribution, coupled with more than 60 years' experience in lamp manufacture, ensures quality products, promptly delivered.

The range of lamps and fittings available is extensive. If you have not received the current catalogue, please send for one today.

QUALITY and SERVICE

CRYSELCO BRANCHES
are situated throughout the country.

Their aim is to give you quality products plus good service.

CRYSELCO Managers in the following towns and cities would be pleased to hear from you.

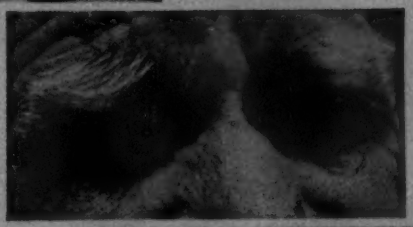
BEDFORD
BIRMINGHAM
BRISTOL
BURY ST EDMUNDS
CARDIFF
GLASGOW
LEEDS
LEICESTER
LIVERPOOL
LONDON
MANCHESTER
NEWCASTLE
NOTTINGHAM
SOUTHAMPTON

CRYSELCO LIMITED
KEMPSTON WORKS BEDFORD

Service on the Land, Ridging (Photo Ford Motor Co Ltd)

A everywhere you look

Art Galleries, Airports, Aircraft, Abbeys.
Banks, Ballrooms, Banqueting Halls.
Cathedrals, Churches, Cafes, Concert Halls.
Drawing Offices, Dance Halls.
Exteriors, Entrance Halls, Exits, Embassies.
Floodlighting, Factories, Football Grounds, Film Studios.
Garages, Guildhalls.
Hospitals, Houses, Hotels, Highways, Halls.
Industry, Institutes, Inns.
Jibs, Jewellers, Jetties.
Kitchens, Kindergartens.
Lecture Halls, Lodges, Libraries, Lobbies.
Museums, Milk Bars, Mosques, Mines.
Nurseries, Nursing Homes, Night Clubs.
Offices, Oratories.
Palaces, Public Buildings.
Quarries, Quadrangles.
Restaurants, Railways, Restrooms.
Shops, Streets, Schools, Stages, Ships.
Theatres, Transport, Town Halls.
Universities, Underwater.
Van Docks, Vestibules, Vaults.
Workshops, Waiting Rooms, Warehouses.
Xmas Street Decorations.
Yards, YMCA Hostels.
Zoos, Zebra Crossings.



Z lighting fittings for every purpose

G.E.C.
LIGHTING DIVISION

THE GENERAL ELECTRIC CO. LTD · MAGNET HOUSE · KINGSWAY · LONDON · W.C.2

Quality of Music, Harpist (Photo Fox Photos Ltd)

CRYSELCO

lamps and fittings can be obtained from any of fourteen branches and depots throughout the country.

All CRYSELCO business is based upon a policy of Quality and Service.

This attention to detail in production and distribution, coupled with more than 60 years' experience in lamp manufacture, ensures quality products, promptly delivered.

The range of lamps and fittings available is extensive. If you have not received the current catalogue, please send for one today.

QUALITY and SERVICE

CRYSELCO BRANCHES
are situated throughout the country.

Their aim is to give you quality products plus good service.

CRYSELCO Managers in the following towns and cities would be pleased to hear from you.

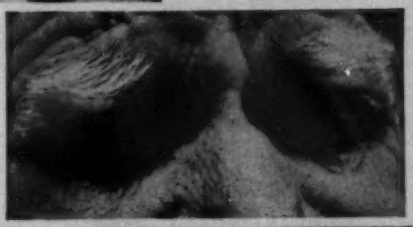
BEDFORD
BIRMINGHAM
BRISTOL
BURY ST EDMUNDS
CARDIFF
GLASGOW
LEEDS
LEICESTER
LIVERPOOL
LONDON
MANCHESTER
NEWCASTLE
NOTTINGHAM
SOUTHAMPTON

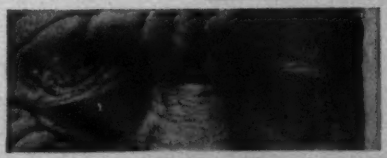
CRYSELCO LIMITED
KEMPSTON WORKS BEDFORD

Service on the Land, Ridging (Photo Ford Motor Co Ltd)

A everywhere you look

Art Galleries, Airports, Aircraft, Abbeys.
Banks, Ballrooms, Banqueting Halls.
Cathedrals, Churches, Cafes, Concert Halls.
Drawing Offices, Dance Halls.
Exteriors, Entrance Halls, Exits, Embassies.
Floodlighting, Factories, Football Grounds, Film Studios.
Garages, Guildhalls.
Hospitals, Houses, Hotels, Highways, Halls.
Industry, Institutes, Inns.
Jibs, Jewellers, Jetties.
Kitchens, Kindergartens.
Lecture Halls, Lodges, Libraries, Lobbies.
Museums, Milk Bars, Mosques, Mines.
Nurseries, Nursing Homes, Night Clubs.
Offices, Oratories.
Palaces, Public Buildings.
Quarries, Quadrangles.
Restaurants, Railways, Restrooms.
Shops, Streets, Schools, Stages, Ships.
Theatres, Transport, Town Halls.
Universities, Underwater.
Van Docks, Vestibules, Vaults.
Workshops, Waiting Rooms, Warehouses.
Xmas Street Decorations.
Yards, YMCA Hostels.
Zoos, Zebra Crossings.





Z lighting fittings for every purpose

G.E.C.
LIGHTING DIVISION

THE GENERAL ELECTRIC CO. LTD · MAGNET HOUSE · KINGSWAY · LONDON · W.C.2

PHOSWARE

FOR ALL GROUP 'B' LIGHTING

FROM THE POST-TOP RANGE

ECONOMICALLY AND AESTHETICALLY THE BEST

Designs Illustrated are:—

1. P.110
2. P.142
3. P.107/A

Full details available on request

Visit Stand No. 14 A.P.L.E. Conference, Folkestone, and see the full range

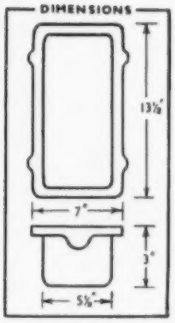
PHOSWARE LANTERNS

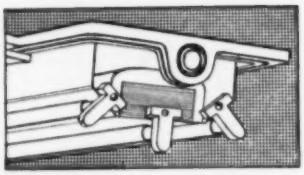
PHOSCO LTD · HOE LANE · WARE · HERTS

Major

Weatherproof Triple Tube Fluorescent Bulkhead Fitting

Cat. No. S.3107
(Switch start only)





The Fitting is designed so that one, two or three tubes can be separately switched for variations of lighting intensity.

(If Fitting is required with only 1 or 2 tubes instead of the standard 3-tube arrangement, a reduced price will be quoted on application.)

Suitable for—

Stairs

Passageways

Public Conveniences

Telephone Kiosks

Warehouses

Cellars

Garages, etc.

This versatile Bulkhead Fitting is suitable for mounting on either wall or ceiling, for indoors or outside, as required, being dust-tight and weatherproof.

The translucent perspex cover fits on a gasket snugly grooved in the alloy base casting, which carries 3 sets of holders to take the fluorescent tubes each 12 in. 8 watts (see sketch).

The fitting is provided with conduit entry at both ends, and (if stated when ordering) can be arranged to have a back entry to suit a standard B.E.S.A. box.

At present the fitting is made in one size only, to the dimensions shown in sketch above.

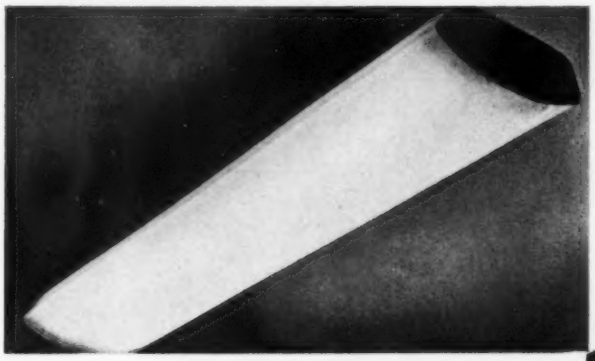
The long life (5,000 hours approx.) fluorescent tubes have the merit of needing only infrequent replacement, which renders the fitting particularly suitable when fixed in inaccessible positions.

Makers of Fluorescent Fittings & Stage Lighting Equipment

MAJOR EQUIPMENT CO., LTD.
22, GORST ROAD N.W.10 ELGar 8041 (5 lines)
Depots: Birmingham, Manchester, Coventry, North Shields, Glasgow

G.F.C.

THE COUNTY RANGE OF FLUORESCENT FITTINGS

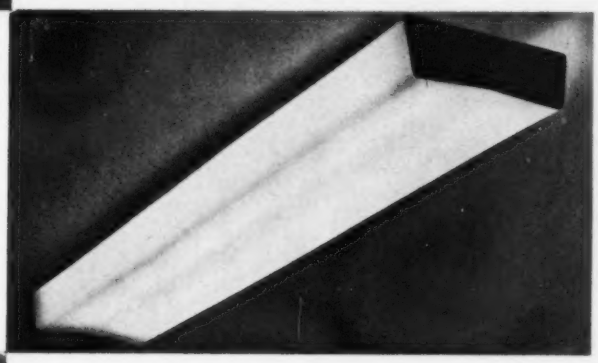


Surrey

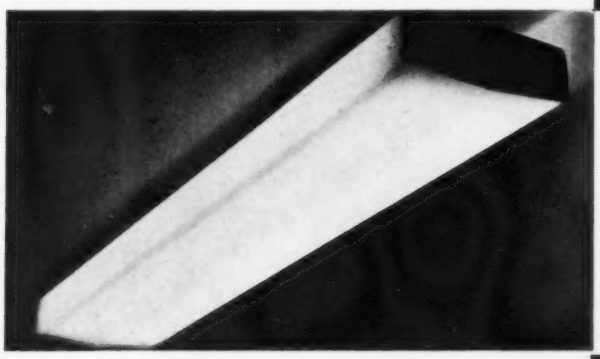
Fittings with clean and functional lines following the modern trend of interior design.

Opal Perspex diffusers with black ends and practically invisible back spines result in high quality fittings reasonably priced.

They are designed as diffusing fittings and not based on an industrial back spine, consequently the lamps and reflectors can be arranged to give maximum efficiency with a wide and shallow diffuser.



Essex

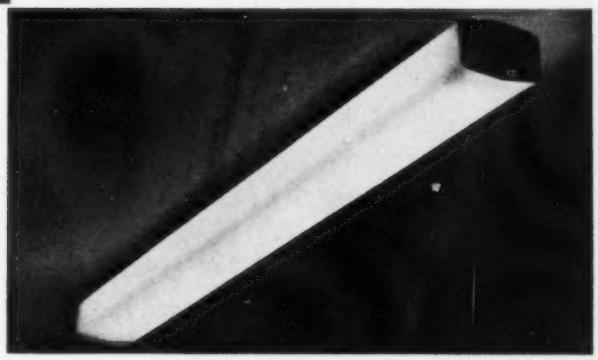


Sussex

Ease of maintenance has been an important consideration in the design of the fittings, the diffusers tilting off from either side for cleaning and lamp replacement. Access to control gear is from below.

Only the best materials are used in the production of the fittings including heavy gauge steel, Perspex diffusers and reliable control gear.

COMPLETE INFORMATION ON THESE WELL-DESIGNED FITTINGS IS READILY AVAILABLE ON REQUEST



Kent

Harris & Sheldon ELECTRICAL **Ltd**

RYDER STREET BIRMINGHAM CENtral 6272 · 46 GT. MARLBOROUGH ST LONDON W1 GERrard 0069

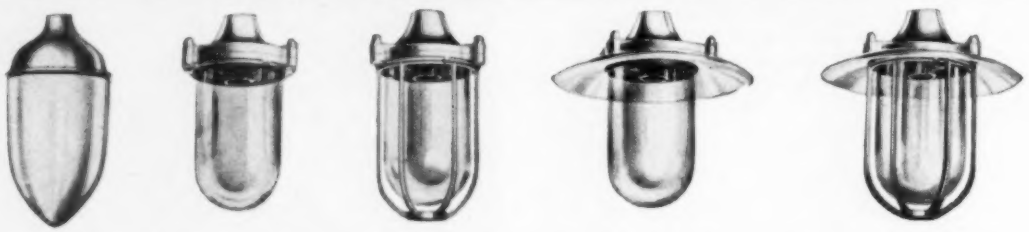
THE HARRIS AND SHELDON GROUP OF COMPANIES · SHOPFITTING · INTERIOR DECORATION · DISPLAY

COUGHTRIE

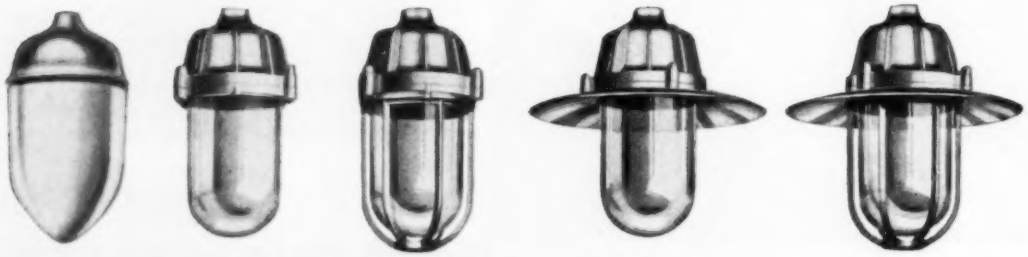
Weatherproof

LIGHTING FITTINGS

AND ACCESSORIES



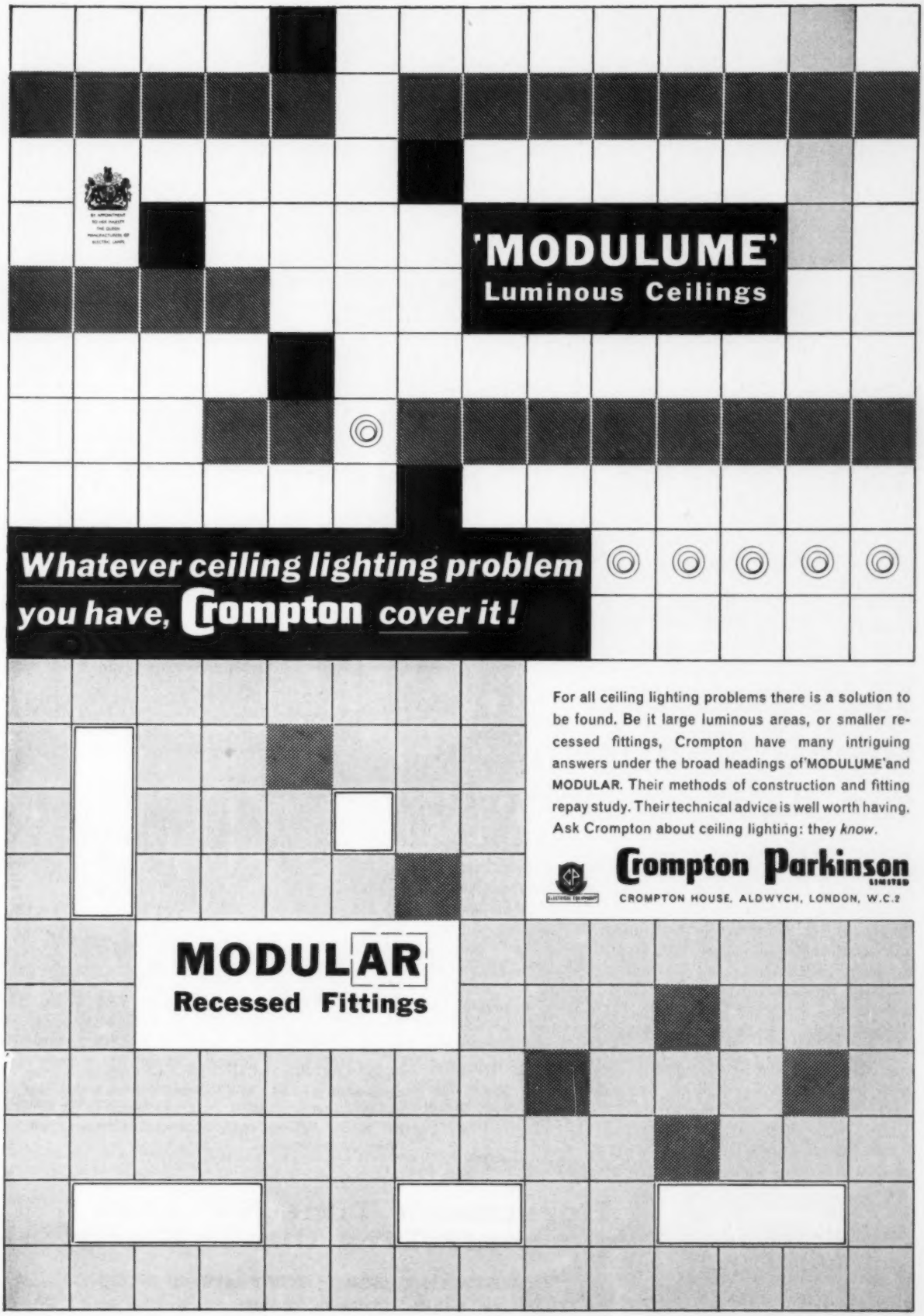
Always better than they have to be



MANUFACTURED AT HILLINGTON, GLASGOW, S.W.2 *by*

J. & G. COUGHTRIE Ltd.

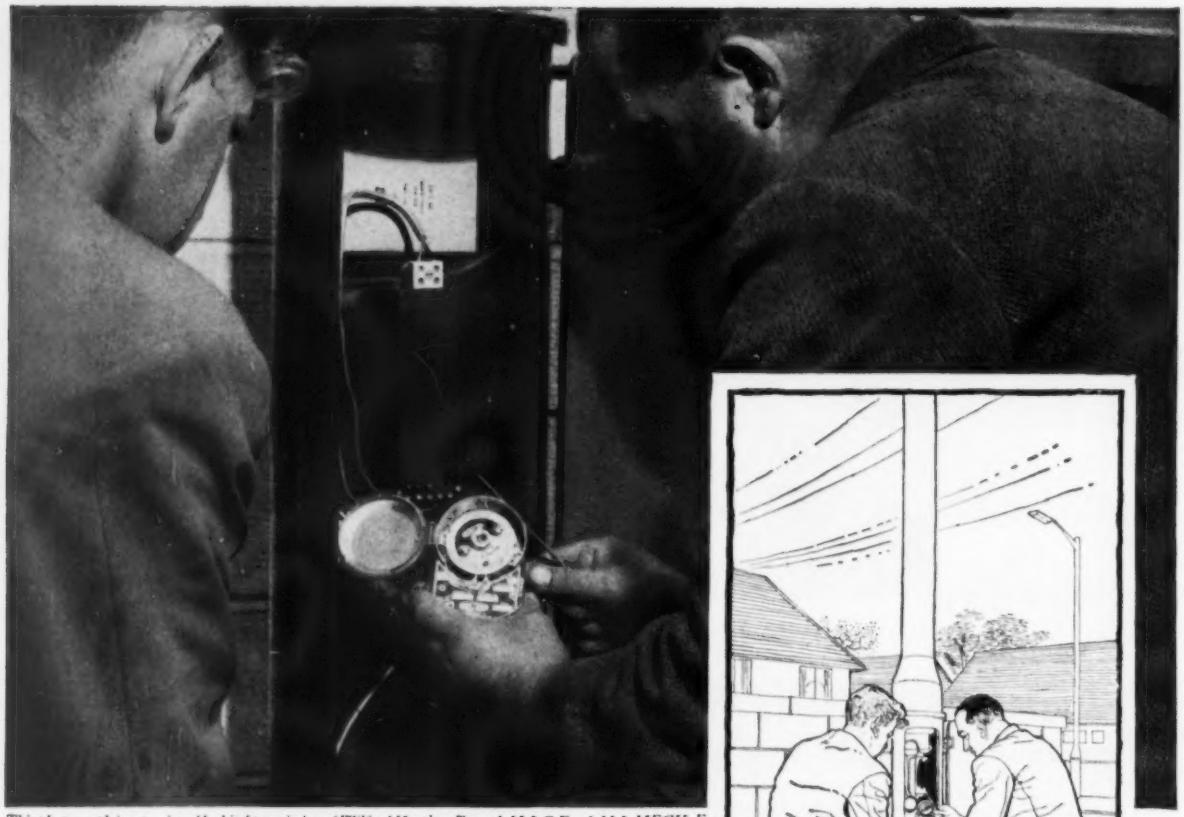
CATALOGUE AVAILABLE ON REQUEST



For all ceiling lighting problems there is a solution to be found. Be it large luminous areas, or smaller recessed fittings, Crompton have many intriguing answers under the broad headings of 'MODULUME' and MODULAR. Their methods of construction and fitting repay study. Their technical advice is well worth having. Ask Crompton about ceiling lighting: they *know*.

Crompton Parkinson LIMITED

CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2



This photograph is reproduced by kind permission of Wilfred Hartley, Esq., A.M.I.C.E., A.M.I. MECH. E., A.M.I.W.E., M.R.S.H., City and Waterworks Engineer, Bath

Horstmann– the automatic choice for lighting control

Once set and installed Horstmann Time Switches can be practically forgotten for they will operate unfailingly under varying conditions of service with very little attention. In addition absolute accuracy is ensured by the use of high grade materials coupled with careful craftsmanship—craftsmanship born of over 50 years experience in the design and manufacture of these instruments. Naturally, in the production of precision equipment, cost is not the most important consideration, yet despite their superiority, Horstmann Time Switches compare favourably in price with instruments not quite in the same class.

The large range of Time Switches which Horstmann make are used for many different applications, notably for the control of street lighting, shop window lighting, electric signs, and special tariff schedules—in short wherever electric current needs to be controlled automatically.

Full details of all models will be sent on request.

Once set, this solar compensating dial will automatically operate its correct lighting and extinguishing schedule.

The Type Q Mark III Time Switch is a two circuit midnight reduction model with 10 amp A.C. capacity per circuit.

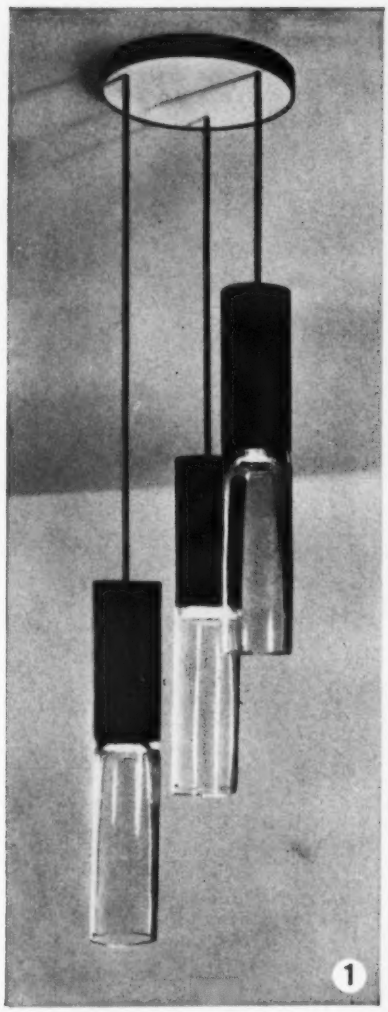
HORSTMANN

Horstmann Time Switches for controlling things Electrical

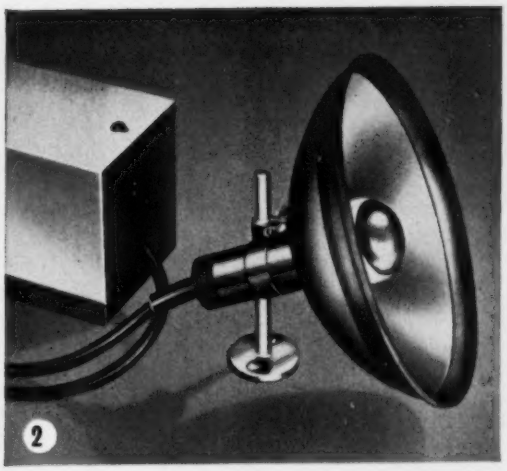
THE HORSTMANN GEAR COMPANY LIMITED

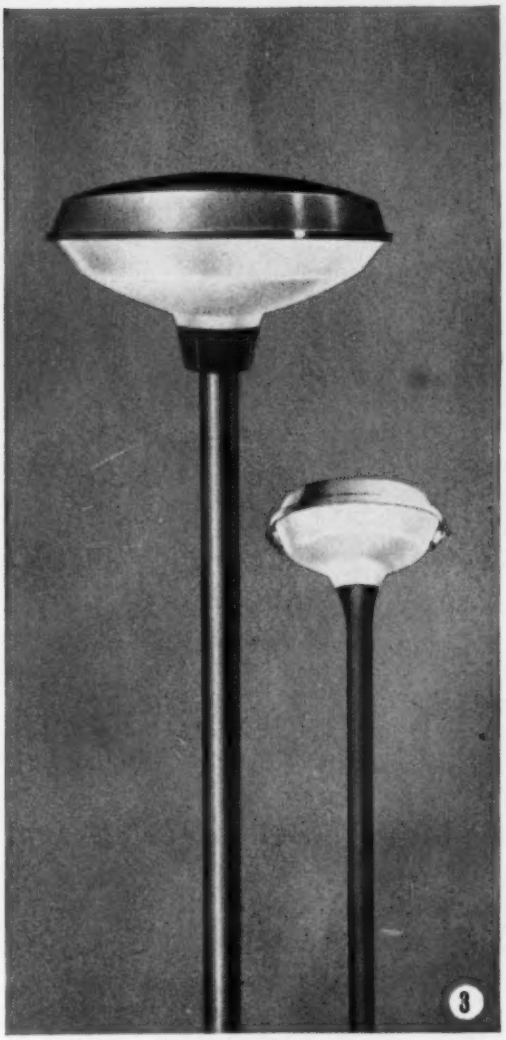
Newbridge Works, Bath · Telephone No. 7241

HG 7



3





COUNCIL OF INDUSTRIAL DESIGN 1960 DESIGN AWARDS FOR ATLAS LIGHTING LIMITED

All the lighting fittings which this year won Design Centre Awards from the Council of Industrial Design are Atlas products. In addition Atlas Lighting Limited now becomes the first company to win three of these coveted awards in the same year.

This highlights the success of the Atlas design policy, which first gained 'official' recognition when the Atlas 'Kitchenlight' won similar distinction.

1. *'Chelsea' handwrought glass lighting fitting G.3 and J Y Glasses.*
2. *Low Voltage Display Lighting fitting DB.0050 with Transformer TR2338.*
3. *Street Lighting Lanterns and Columns. Models Gamma 4 and Gamma 5.*

ATLAS LIGHTING LIMITED
THORN HOUSE, UPPER ST. MARTIN'S LANE, LONDON, WC2.

atlas

DTV

C. C. Judson, B.Sc.(Eng.), A.M.I.C.E., M.I.Mun.E., A.M.I.W.E.
Surveyor and Water Engineer, MALVERN U.D.C.

THE ESTATE MINOR 'X'

THE ESTATE MINOR 'X' concrete lighting column used at MALVERN with the PHOSWARE P107A lantern, is approved by The Council of Industrial Design and carries the B.S.I. Kite Mark.

CONCRETE UTILITIES LTD., WARE · LIVERPOOL · HIRWAUN · NEWCASTLE

Light and Lighting

Vol. 53 No. 9

CONTENTS

Supermarkets: A lighting symposium of three articles, by P. Stone, R. J. Cecil and E. W Summers, setting out the techniques of supermarket retailing, the special lighting requirements they impose and some of the ways these requirements are satisfied in practice, with illustrations of British and overseas installations **(page 230)**

BBC Television Centre: Technical description of the general and production lighting installations at the BBC's new centre for television programmes, reviewing the main architectural features of the building, the use of standardized and decorative fittings and the equipment and control system employed for studio lighting **(page 248)**

'Son et Lumière' at Norwich and Portsmouth: Brief account of two recent installations—the fully automatic 'Aurama' system at Norwich Cathedral and the manually controlled scheme for HMS *Victory* **(page 253)**

Hanover Fair 1960: Reviews by R. L. C. Tate and E. Wittig of new lighting techniques and equipment introduced by German manufacturers at this year's Hanover Fair, the emphasis being chiefly on decorative fittings for domestic and commercial use but including also recent street lighting **(page 254)**

New Products: Information on recently introduced lighting equipment **(page 258)**

Lighting Abstracts: A record of published works in lighting and allied subjects **(page 259)**

Miscellany: Education — Personal — Industrial Notes — Overseas News — Situations **(page 260)**

Postscript: by 'Lumeritas' **(page 262)**

Published by the Illuminating Engineering Society at 32 Victoria Street, London, SW1 (ABBey 7553). Printed in England by the Shenval Press, Simson Shand Ltd, London, Hertford and Harlow. Advertisement enquiries to W. H. Bell, 43 Blandford Street, London, W1 (WELbeck 4816).

Fluorescent 'White' Light

With the advent of fluorescent tubular lamps a new era opened in the history of artificial lighting: an era remarkable not only for unprecedented efficiency in the conversion of electrical energy to light but also for unprecedented variety of spectral quality of the light generated. There are now at least seven different 'white' lights obtainable from single tubes within the production range and, as there is no sign that the lamp industry is halting development of light quality, the time may come when the '57 varieties' claimed for the products of a certain canned food manufacturer may be matched by the number of varieties of 'white' fluorescent light. Indeed, since the colour rendering given by nominally similar tubes made by different manufacturers does not seem to be identical, already a choice of more than seven kinds of 'white' light is open to users of fluorescent tubes. It may well be thought that this variety is sufficient to satisfy all tastes and all real visual needs. Maybe it is more than enough, because the apparent difference between lighting by certain of the named lamps is small and detectable by most people only if simultaneous or quickly successive comparison is possible. With durations of exposure sufficient for adaptation to the composition of the light and its rendering of the visible environment, it is a case of 'How happy could I be with either were t'other dear charmer away.' Probably the best range of tubes is yet to emerge.

SUPERMARKETS

A LIGHTING SYMPOSIUM IN THREE PARTS

Supermarkets have revolutionized retail distribution. The nineteenth century idea of individual customer service has vanished, to be replaced by an impersonal help-yourself transaction in which the assistant's deft influence over the shopper's purchases is completely absent. Other, more subtle, means to influence the purchaser have been required to ensure the high rate of stock turn-over which is essential for commercial success. Light has been one of the most compelling of these new media; its generous use arrests the passer-by and entices her (and him) into the store, where its careful use highlights particular displays to stimulate the acquisitive impulse. The techniques of supermarket retailing and the requirements they impose on the lighting are set out in the following symposium, which brings together three authoritative views on this growing development. Mr Stone is a freelance journalist who has made a particular study of the subject; Mr Cecil is an architect and Mr Summers a lighting engineer, both of whom have extensive experience with this type of premises.

PART ONE: THE BACKGROUND STORY

by Peter Stone

I WAS TALKING recently to an executive of one of our leading caterers, a man whose job it is to study the ever-changing pattern of customers. He admitted that they were just now losing customers from their teashops, and he gave as one of the reasons the changing pattern of shopping. The suburban housewife is not making such a great occasion of her shopping. Not so often does she collect a neighbour and come into town for the day, having elevenses, lunch or tea. She does it in half an hour at the local supermarket.

Supermarkets started in the USA following the depression of the early thirties, and there are now about 30,000 of them there, handling almost 70 per cent of America's food shopping. The pioneer was King Cullen, who put up the idea to the multiple grocery he was with. They turned it down and he branched out on his own. The idea came to England in the 'fifties and to Switzerland about the same time. Within the last few years Germany, Holland, France and Italy have also entered the field.

The word 'supermarket' seems to have come from Hollywood, but a British definition is: 'A self-service shop over 2,000 sq. ft. selling a full range of foods, including fresh meat, fruit and vegetables, and also some household non-foods.'

In this sense Premier Supermarkets are probably entitled to their name as being first in the field in England. They are a subsidiary of the Express Dairy Co, who started converting their premises at Earls Court and Streatham to the wider purpose in the 'fifties. The company now has 22 supermarkets in Greater London and the Home Counties with 5 more planned for this year.

By 1942 the London Co-operative Society had established their first self-service food shop at Romford: by 1947 they had 10, and by 1949, 400. In 1950 Sainsbury's, the purveyors, started converting their shops to self-service, a process that was immediately successful and has been extended towards the supermarket field. Sainsbury's now have 27 self-service food stores.

They are anxious, however, to remain Sainsbury's and not become just another supermarket. There are many distinctions between them and most of the others and it can even be argued that they are not supermarkets (which would not worry them at all) for they sell nothing but food.

Other supermarkets in this country have been estimated to sell about 10 per cent of non-food household goods (such as detergents) and about 2 per cent of personal goods (such as toothpaste and shampoo). In America the comparable figures are about 20 per cent and 10 per cent of total turnover.

Personal goods are still feeling their way over here. Premier tried to sell cosmetics in a big way with a trained beautician in charge, but the attempt was a failure. They have no difficulty, however, in selling brassières, suspender-belts and stockings; and 'men's furnishings' like shirts, sweaters, socks and gloves (all stocked in middle sizes only) are a success. It may be that a woman has two purses and two moods —one for businesslike acquisition of the necessities, the other for leisurely consideration of the luxuries, and she likes to keep them separate. There is a ready sale, however, for toys, greeting-cards, stationery and paper-backs.

Principal marketing organizations

Among the principal supermarkets in this country (besides the Co-ops) are Fine Fare, who have 42, Anthony Jackson's Foodfare with 23, Victor Value 15, Tesco with at least 11 new ones this year, Cooper's 10, and Waitrose with 8. Then there is Prideaux, who have supermarkets at Croydon and Streatham, supplied by farms in Somerset. They specialise in meat, on the assumption that the housewife buys her meat first and then the rest of the menu.

In addition to the separate supermarkets many department stores have turned their basements into self-service grocery and food stores on supermarket lines, Altogether there are nearly 350 in the country today, mostly in the south-east and north. In 10 years' time there are expected to be about 3,000. At present the Co-operative Societies own nearly half of all supermarkets in operation; they and the larger multiples account for nearly 90 per cent of the total.

A supermarket aims to make each customer's visit a voyage of discovery. There is every kind of tea, soup, biscuit, jam on the shelves—always something new to try. Chicken barbecues are among the services at many. Premier have an arrangement with MacFisheries. They were pioneers in the pre-packing of fish and did it for MacFisheries at Reading. Now MacFisheries have a pre-packed stall in their own name at the Premier supers, thus lending a famous name to a pre-packed

'Men do not seem to mind shopping in the supermarket with their wives' shopping lists', in this example from Sainsbury's.

'One of the most important aspects of a self-service store is service . . . mainly behind the scenes', again at Sainsbury's.

food, that, more than others, needs the public confidence. Frozen foods, too, can usually be obtained, and a good deal of their increasing popularity is owed to supermarket development.

At most supermarkets branded groceries can be obtained at cut prices, and it is obvious that self-service with its much faster turnover allows of this. Price reductions are permanent at the Fine Fare supers; they are a planned part of Waitrose's merchandising policy; and Sainsbury's do not hesitate to sell below recommended prices if the margin is more than they require, but never below cost. Their latest 'See what you save' list gives 67 items at less than the manufacturer's or usual price. It is the most famous names like Heinz and Crosse and Blackwell that are subjected to this process, for the old slogan of 'small profits, quick returns' is applicable to them.

It is alleged that some markets compensate themselves for these cuts by adding a few pence here and there on less-known brands, the assumption being that the customer will not notice this but will notice the featured cuts on the national brands. A survey carried out in 1958 by Consumer Research could find no conclusive evidence either way on this allegation.

At various times several of the supers have sold a picked selection of regular offers, such as one tea, one jam, one coffee, one cereal, below cost in the hope of making up their losses by attracting customers who will buy other things too, but it is obviously not the kind of merchandising that can be more than temporarily effective.

Branding policies

Many supermarkets and other food stores put out brands of their own under their own labels—private labels, as they are called. For this to be successful there must usually be a big price differential. By one store or another almost a whole grocery range is offered: Tesco have about 100, Sainsbury's 60, Premier 40. Although the price is lower, the profit margin is usually higher. For one thing they know what market to produce for, for another they need not advertise. Sainsbury's sell their own cornflour for 6*d*. next on the shelf to Brown and Polson's for 1*s*. Premier sell their own cheese spread for 9*d*. on the same shelf as a national brand at 1*s*. 2*d*. Moreover it is the same cheese spread, made by the same manufacturer.

In general the policy is to give private labels the same display as national brands. There are now 63 private label brands of instant coffee, Premier being the first in the field and getting a bigger margin of profit from their own brand at 2*s*. than from the cut-priced Nescafé and Maxwell House. Tesco do a coffee at 1*s*. 11*d*. against the national brands at 2*s*. 9*d*. and claim to have captured 25 per cent of the sales of the national brands already. A few of the private brands are made by the manufacturers of Maxwell House.

A private brand is often introduced by the sacrifice of the slowest selling national brand. The new brand takes its place on the shelf and usually in the customer's basket.

A social side is also being developed. Many supermarkets now have coffee bars and play bays for the children furnished with rocking horses and rockets to the moon. Some publish magazines for their customers; and phrases like 'Meet you here about 11 tomorrow and we'll stroll around' are frequently heard.

Though it sounds contradictory, one of the most important aspects of a self-service store is the service. When Sainsbury's convert a shop they increase their staff by 50 per cent, mainly behind scenes, for meat has to be pre-packed at store level.

The ratio of takings must increase accordingly. There is also the service at the cash desks, which must combine efficiency with almost exaggerated courtesy and friendliness to offset any idea of automatism. Then there is the service behind the delicatessen counter, which must still be personal.

Some shops display a poster photograph of the local manager with his name and a notice to the effect that 'This is your manager. This is his office. Walk in and see him if you are in difficulty. He is here to serve you.' Some have a suggestion box. Recently I found the following written on a suggestion pad: 'Please don't turn off the radiogram when it goes wrong. I haven't had such a good laugh for years.'

There are also smartly uniformed hostesses circulating among the customers to advise them on their purchases. Premier have a training school at North Finchley where an attempt is made to build up a whole staff so that they look upon the supermarket as a career. Labour turnover with Premier is low: only about 2·5 per cent for men, but naturally more for women. To get the right women as hostesses and keep them is not easy.

Some firms set their faces against music. Some go to the other extreme and have a steady flow of background music even interrupted by TV advertising jingles. These are cunningly selected and timed. Big advertisers like Kraft and Walls inform the markets in advance of their monthly programmes of advertising. The markets select appropriate items, arrange special displays, and call attention to them with the jingles.

Another merchandising trick is the use of 'dumpies', scattered casually and looking like refuse bins with tins thrown higgledy-piggledy into them. A woman can be put off by too much tidiness and may think she is getting a bargain in a haphazard-looking 'dumpy'. Anyhow sales from 'dumpies' have been found to be higher than of the same tins stacked tidily on shelves.

'Another merchandising trick is the use of "dumpies" scattered casually and looking like refuse bins . . .', here seen at Cooper's Stores.

Research and design

There is a research and design department, sometimes with a woman architect attached, and from time to time there are experimental changes in design and lighting. Some have lowered the height of their gondolas, as the island fitments are called, to allow an uninterrupted view; others have increased the height from three to four shelves to hold more goods. The less often restocking has to be done the better. It is a cumbersome operation even when the store room is on the same floor; usually it has to be above or below and is dependent on lifts. Good stocking depends a lot on good warehousing and distribution. Premier claim to have the most modern distributive warehouse in Europe at Ruislip, with mechanical handling and specially designed transport. They also have their own nurseries at Egham.

Each of Sainsbury's markets has its own warehouse and preparation room, air-conditioned, and bigger than the store itself. There is a high standard of food hygiene with mosaic floors, tiled walls, stainless steel fittings and no wood. Sainsbury's have a farm in Scotland for pedigree cattle—they also buy meat—and their own abattoir for pigs. Their egg-packing station in East Anglia is claimed to be the biggest in Europe.

Lighting is a problem that has practical elements like the discolouring of meat as well as amenity value. Colour is a study in itself. Red is restless and therefore is useful to have about the entrance to get people in and out quickly, but right inside pastel shades are favoured. The need is to get the housewife relaxed. In America they have 'blink studies'. If you are on edge when shopping, you blink a lot. So observers are from time to time posted at each stall to count the blink rate. If it is high, there is something wrong; and the stall must be reset, resited, redecorated or relit.

Consumer surveys

We do not favour such microscopic surveys over here, but people are asked simple questions like 'Why do you come here? Can you find what you want easily? If not, what do you do about it?' It is reckoned that the average customer comes three times a week and spends about 10*s*. a time. Men are said to hate queuing behind women and asking for what they want in the presence of women, but they do not seem to mind shopping in the supermarket with their wive's lists. And they go with their wives on late nights. Most markets are open till 8 p.m. on Fridays.

Fridays and Saturdays are of course the busy days and their combined takings can easily equal the other four days of the week put together. One of the problems, in the acquisition of premises, is to get a broad enough frontage to accommodate enough cash desks for the end-of-the-week rush.

An American survey in 1959, based on interviews with shoppers as they went in and the same shoppers as they came out, showed that 70 per cent of purchases were the result of decisions made in the store. A quarter of the shoppers carried a complete shopping list. Half the shoppers were women alone; three out of ten brought their husbands or children. Three visits a week was the average.

EXAMPLES

Great Britain

Above, the use of a luminous ceiling for general lighting at Sainsbury's, Paddington, although this technique is no longer being employed in view of the difficulties in maintenance it presents (Lumentated Ceilings). In contrast, on the left, is an arrangement of lines of single-lamp fittings for general supermarket lighting at the Royal Arsenal Co-operative Society's Woolwich store which gives good results despite a tendency to pull the customer's eye down the store (Courtney, Pope).

Above shows the use of transverse enclosed fittings for general store lighting, at Albert Hide's, Bexleyheath (Crompton). Right, the interior of Sainsbury's original supermarket in Drury Lane, employing 2 ft. square pans grouped in panels 10 ft. by 8 ft. for general lighting (Lumenated Ceilings). Below, an example of longitudinal runs of fluorescent lamps for general lighting, at Premier's Harrow Branch, contrasted with the indirect lighting concealed in the entrance canopy.

PART TWO: THE LIGHTING APPROACH

by Raymond Cecil, Dip Arch, ARIBA

SUPERMARKETS, being a comparatively new form of retail sales unit, have given rise to a set of detailed problems unlike those in other forms of shops and stores. It is true that most of the problems arise in one form or another in other buildings, but certain aspects of supermarket design intensify the impact of the several considerations. The supermarket differs from, and should not be confused with, the self-service shop. The basic difference is that the area of unbroken public space is so great that it is not possible to dragoon the buying public through a set route which takes them past all the displayed goods. In size, supermarkets vary between 2,000 and 10,000 sq ft of public space, and it is quite possible that within the near future we shall see the first 25,000 sq ft supermarket in Britain.

As a building type, the supermarket breaks new ground in that the building and display factors alone have to sell the goods which previously were handled by sales staff. It follows, therefore, that every aspect of the design of a supermarket must be regarded as a potential factor in increasing sales. This applies as much to the lighting as to the design of the shop-front, and the disposition and display of the goods. It is axiomatic that goods on well-lit displays sell quicker than those on dull displays, and it might be thought that the problem is simply one of high intensities. It is, however, complicated by the sales policies of the supermarket groups, which aim at selling mass-use necessities at or near cost-price, while encouraging the sale of non-essentials and luxuries that carry higher profit margins and provide the greatest scope for the increase of over-all profit.

Entrance to Sainsbury's original branch in Drury Lane.

Briefly, we may summarize the merchandising factors which affect the lighting as follows:

(i) The lighting generally should be a feature to attract customers towards the store. This is not essential, but as the lighting is, anyway, costly it should be used to the greatest effect.

(ii) The general intensity should be sufficiently high and the distribution sufficiently good for all goods to be immediately and readily visible.

(iii) Special lighting effects should be used to increase the sales of slow-selling or high-profit lines.

(iv) The general arrangement of the lighting should draw the customers into the depth of the store.

When designing a lighting scheme for a supermarket, it is desirable to start with a basic level of about 60–70 lm/ft². This is an arbitrary figure based on experience and one that is tending to increase all the time. Probably, in two or three years time this figure will be 100 lm/ft², though under present conditions it is considered that the cost of increasing the intensity to this level would not produce a proportionate increase in sales. The remainder of the lighting scheme has to be related to this basic intensity and, as general intensities increase, so other problems develop. General lighting in the body of the supermarket can be achieved successfully by using continuous rows of single or twin-lamp fluorescent fittings, so as to give directional lighting along the lines of display fitments. This arrangement tends to pull the customer's eye down the store, but is otherwise not obtrusive. Luminous ceilings can provide a satisfactory alternative, though from the point of view of maintenance they are more troublesome than fittings with naked lamps—and maintenance in supermarkets is a matter of considerable importance.

Initial impact

The entrance area of the supermarket can be treated in several ways and much depends on the sales policy of the firm concerned. One school of thought favours the 'Dazzle' solution, while the other favours a more subtle approach. The aim of the 'Dazzle' effect is to present maximum glare to the passer-by with the aim of *arresting* custom rather than attracting it. An alternative solution is to diminish the lighting in the vicinity of the shop window (which is not used for displaying goods) and use it purely for decorative effect.

Exit and pay desks at Victor Value's, Hayes, where lighting is purely decorative, employing low-power lamps recessed into false ceiling and screened by cut-outs of acrylic plastic.

With this arrangement the brightly-lit interior of the shop draws attention to the area where the goods are actually displayed. A good example of this approach is seen at the Victor Value Supermarket at Hayes, Middlesex (see illustration), where the entrance area is lit by about 170 low-power lamps recessed into the false ceiling behind coloured acrylic plastics cut-outs. The lower intensity in the vicinity of the entrance provides an additional benefit in that it allows for a period of optical adjustment on entering or leaving the store either at night or during brilliant daylight.

The disposition of goods through supermarkets varies considerably, but a common arrangement is to devote the body of the store to mass-selling and impulse-sales lines, while speciality lines, perishables and refrigerated displays are at the sides and end of the hall. It is in these areas that the highest degree of lighting contrast is required to spotlight the displays and bring the customers out to the extremities. This contrast lighting needs to be between 120 and 250 lm/ft^2 to be effective and to register against the general illumination. To concentrate the contrast and to prevent spillage, mounting height in these areas should be well below that of the main lighting fittings. Depending on other considerations the luminaires may be independently suspended or housed in bulkheads. If the latter, the bulkheads themselves can provide good location for bold illuminated signs advertising the goods on sale in the area.

Contrast lighting is generally more effective if it contains at least a proportion of tungsten fittings to provide 'sparkle' for the goods on display, as this cannot be provided by fluorescent fittings alone. Other problems arise, however, and these are dealt with in the following sections.

COLOUR RENDERING. This is a major problem in that other factors almost preclude the sale of any goods by natural light. While one or other of the standard fluorescent lamps will generally be satisfactory for the display of packaged goods, these lamps are not suitable in the areas where perishable goods are sold. If meat, bacon, cooked meats, fruit or vegetables are not displayed in what the customer considers to be their true colours, sales drop quite dramatically. Most, if not all, fluorescent lamps produce a spectrum overloaded with blues and greens and deficient in reds and yellows. This makes meat appear dark so that it seems unattractive and dry if not downright bad. In the case of cooked meats and bacon the public has been conditioned, over a period of many years, to the use of red lights or filters, and will accept that inefficient form of lighting. In the case of fresh meat and vegetables, however, any hint of 'faking' diminishes sales to vanishing point.

This problem can be met only by mixing fluorescent and tungsten lighting in the correct proportions, though there has been developed recently a fluorescent lamp with a red-reinforced spectrum and a blue filter coating. This lamp goes a long way towards meeting the criticisms of fluorescent lighting, though there is an enormous body of prejudice within the trade which must first be overcome.

INFRA-RED RADIATION. Attempts to meet the colour problem by using batteries of tungsten lamps brings the subsidiary problem of infra-red radiation. Where light intensities of up

Examples of perimeter display lighting, both in the same store, based on the use of tungsten fittings for the lighting of meat and similar foods. Note also the incorporation of fluorescent lamps in the display cabinets (Courtney, Pope).

to 200 lm/ft² are required, tungsten spotlamps and floodlamps literally cook fresh meat even when it is in a refrigerated case. This problem has yet to be solved, though the solution is probably an infra-red filter which does not also filter the visual red component. Such filters already exist, but they are costly and available only in small sizes (principally for cine-projectors). Most other heat-absorbant glasses are green-tinged and distort the tungsten spectrum so much that they are useless for this purpose.

HEAT EMISSION GENERALLY. Besides the problem of radiated heat, there is the added complication of heat emission generally. The average lighting load from fluorescent lamps in the main store area may be in the region of 5–6 W/sq ft of floor space. Under the canopies or over the speciality areas, where intensities are higher and a proportion of tungsten lighting is used, the load may be as much as 35 W/sq ft. When one remembers that an average 10 W/sq ft is a reasonable allowance for space heating in a store in winter conditions, it will be appreciated that this level of heat output can be a serious embarrassment during the summer.

Wherever possible, a virtue can be made of necessity by using the heat output in the winter by means of false ceilings, within which the heated air may be entrained in the fresh air brought in from outside, and redistributed in the sales and entrance areas. In summer the process can be reversed and the hot air expelled outside the premises. The importance of dealing with this heat build-up is proved by the frequent cases of control gear overheating and lamps burning out where the problem has not been adequately considered. It is, of course, a problem which fittings manufacturers and designers could help to solve by developing equipment with greater heat-resistance or improved facilities for ventilation.

COST FACTORS. In all aspects of supermarket design, cost is of the utmost importance. We are dealing with such large areas and quantities of fittings that no designer or client can afford to disregard the cost of individual items as is sometimes possible when small numbers are involved. Similarly, running cost is an important consideration, partly responsible for the increasing use of fluorescent fittings. In most supermarkets the simplest of standard fittings are used and, wherever colour considerations permit, the more-efficient fluorescent lamps are preferred. It is unfortunate that lamps which produce the best spectrum are only about half as efficient as standard white lamps.

MAINTENANCE. At present, few, if any, supermarkets have maintenance electricians on their staffs, though with the amount of equipment installed this state of affairs may have to be rectified. Accordingly, maintenance must be simple and capable of being carried out, either by untrained staff or by local firms of electricians. Re-lamping is a big problem and even group replacement is not a complete solution. Faulty lamps are a serious distraction, and fittings that are not alight are unsightly, besides creating an impression of inefficiency. What is required is a degree of reliability approaching perfection. Failing this, it is probably best to use naked lamps wherever possible to facilitate maintenance and elsewhere to consider minutely all relevant conditions to ensure that there is no possibility of over-heating.

CONCLUSIONS. Considerable experience in this most specialized field has convinced the writer that the approach to supermarket lighting must be scientific and the execution meticulous in all details. The empirical approach which suffices for some other forms of lighting installation is totally inadequate and is bound to lead to schemes which fail on grounds either of economy or effectiveness. The lighting specialists and the fittings manufacturers have a big part to play in this process, but the ultimate success or failure of any scheme must depend largely on the ingenuity of the architect.

Waitrose's store at Hounslow provides a good example of store-front lighting and bright interior.

PART THREE: PRACTICE AND PRECEPT

by E. W. Summers, FRSA

THE RAPID INCREASE in supermarket trade in the United States, the pattern of which has been copied by most of the western world, has widened the vistas of retailing and transformed the chore of food-shopping into a pleasant activity. The part that lighting has played, and is playing, in this development is studied in the following article.

It is apparent that the gap between the supermarket, with its self-service system, and the chain store, with its self-*selection* and assistants, is closing, but from the viewpoint of their lighting the two types of retail outlet still differ greatly. This article is concerned only with the true self-service store.

Normally, a store owner's main requirement is that the goods on display should be the brightest objects in the shopper's visual field. In the supermarket, however, an important role of the lighting is that it should create an environment which the public will associate with keen prices and hygiene. Both externally and internally, high intensities of light are used systematically to attract the eye and, hence, the shopper. These bright areas are not necessarily the merchandise, but may be coloured ceilings, walls, signs, etc. Thus, the lighting of a supermarket is more an art than a craft.

Exterior

The exterior of the supermarket must look modern and make an immediate impression on the passer-by. Thus names that 'roll off the tongue' are coined by the promoters, while shop-fronts and signs that 'sing out' are used to attract custom and enable the store to compete with other traders. Luminous signs are lit by hot-cathode tubes of the highest efficiency (cold cathode is fast losing ground for this type of sign) so that the large plastic fascias, with their surface-mounted letters, can be read from long distance. So far, the flashing signs used in the United States have not taken hold in the UK, but signs are getting bigger and brighter and, in some instances, can create glare hazards for road-users.

Windows

The windows of the supermarket are, in effect, glass walls enclosing the selling area. They are usually lit on the inside glass line by tungsten blended with either fluorescent or mercury-fluorescent lamps. This lighting continues into the interior the interest created by the exterior signs, inviting the shopper to enter. In addition, it increases visibility into the store by reducing street reflections in the glass.

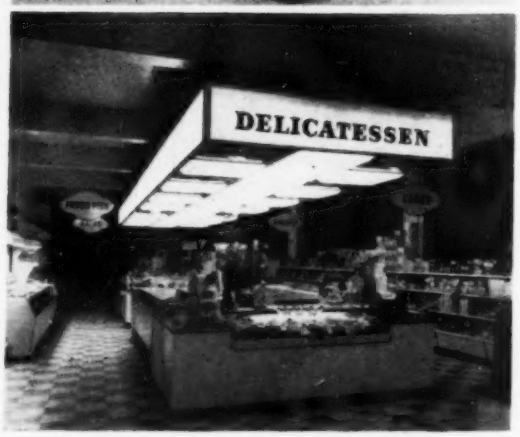
For recessing into the ceiling, there are now available special fluorescent units with asymmetrical reflectors which leave the lamps uncovered (see Fig. 2). From small wire loops incorporated in these fittings promotional signs can be hung. Intensities of over 150 lm/ft^2 are common along these windows areas.

Entrances

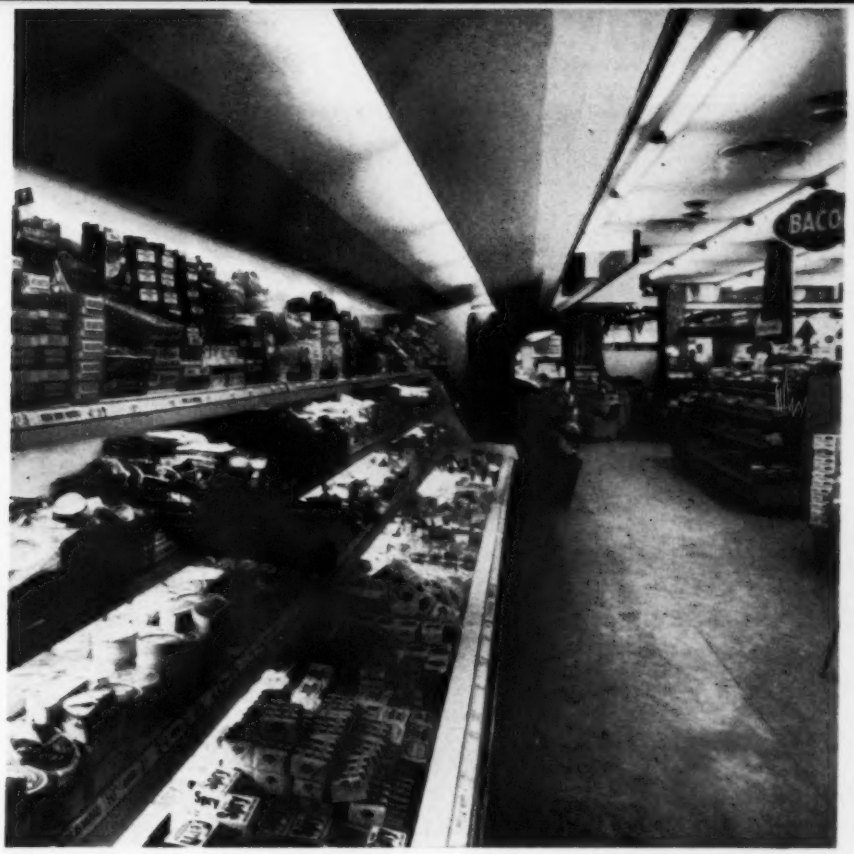
On the Continent warm and colourful entrances are being provided by using high-intensity tungsten lighting—from infra-red internally-silvered lamps and general-purpose lamps in simple recessed fittings—to light glass doors which can, in many cases, be folded away when desired (see page 230). This idea is now gaining a foothold in Great Britain, though here fluorescent lamps are still more commonly used. In the

(Continued on page 243)

EXAMPLES | Great Britain (continued)

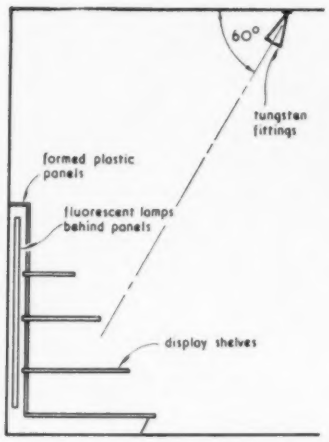


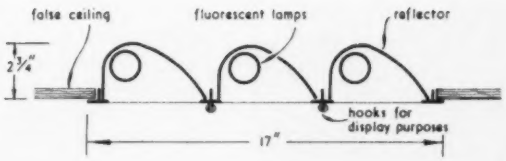
Above, an example of wall-to-wall luminous ceiling for general illumination, supplemented by peripheral canopy lighting over the display shelf (Lumenated Ceilings). Right (upper) is illustrated the use of tungsten fittings for general lighting (Holophane), whilst right (lower) is a close-up of a counter lighting canopy making use of a modular ceiling and spotlamp inset panels (Crompton, Parkinson).



Opposite, at David Greig's, Chichester, is seen the use of modular luminous-ceiling pans to provide general lighting and perimeter lighting, supplemented by canopy lighting over display shelves and ceiling mounted spotlamps. To right, Premier's Harrow Branch provides an example of perimeter lighting recessed from direct view in the canopy over the display shelves.
Below, the Queenway stores, Crawley, provides an interesting example of combined tungsten and fluorescent fittings for general lighting, provided mainly for good colour rendering but also giving considerable visual interest (Atlas Lighting).

American supermarket where luminous ceiling is used to provide the high level of illumination required for checking customers' payments (General Electric).





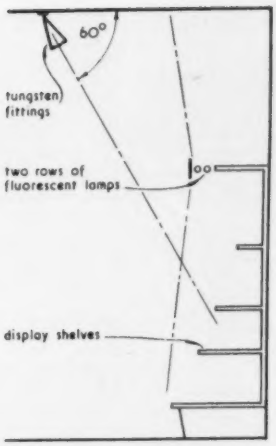


Fig. 1, left, American display stand with fluorescent luminous core, particularly suitable for use with transparent merchandise. Fig. 2, above, cross-section of recessed ceiling fitting with asymmetrical reflectors for window lighting. Fig. 3, right, side-wall display stand with lamps concealed behind pelmet on the front of the canopy for both local lighting and store perimeter illumination.

future, no doubt, warm-air curtains will be more widely adopted, provided their cost can be reduced.

Interiors

It is in the interior of the supermarket that lighting and colour together play their most important part. While the quality and the price of the goods and the methods used to display them are essential to the success of a store, without light and colour it is doubtful whether any supermarket project would succeed, for there is no personal service, and the lighting largely replaces the salesman's persuasive tongue.

General levels of illumination are tending to rise above 100 lm/ft² and brightness ratios and glare must, therefore, be given careful consideration. For stores with low ceilings such a high level of illumination should not be aimed at, unless fittings with diffusers are used, otherwise discomfort will lead to loss of both customers and staff. Where ceilings are low, the luminous ceiling provides one solution to the problem.

The designers of the lighting scheme must provide plenty of brightness, without departing from the general principles of good lighting practice, and, at the same time, keep the initial cost, running cost and maintenance cost within reasonable limits. It is imperative that the lighting and the colour schemes should be co-ordinated, the decorations being mainly in light tones, including the floor, which should be as light and gay as possible.

For economy, American supermarkets are using high-efficiency fluorescent lamps, and the 8-ft. 'Power Groove' and 4-ft. 'Premium' lamps are proving a big success. For the former, General Electric are now quoting a figure of 15,000 initial lumens, and in some American supermarkets continuous rows of twin-lamp surface-mounted diffuser fittings are being used to give intensities of over 150 lm/ft².

At the Sure-Save Food Mart in Skokie, Ill., where these new lamps have been used, there is an overall intensity of 160 lm/ft², with 240 lm/ft² in special areas. The high output of these 'Power Groove' lamps suggests many new applications. For example, Alfred Makulic, the American store-lighting specialist, has suggested that a simple reflector built into the top of each gondola, giving only upward light, could provide a level of 200 lm/ft² from a 'reflective luminous ceiling', at a fraction of the cost of a conventional luminous ceiling (with its plastic diffusing medium) and with vastly simplified maintenance.

In the UK 8-ft. 125-watt lamps in new colours, and lamps of up to 200 watts, are being mooted, but so far, 'Power-Groove' lamps are not available.

Supplementary Lighting

General lighting in the supermarket must be supplemented by perimeter lighting, which has a three-fold purpose: it lights the peripheral areas, the merchandise and the identification signs. Lamps housed behind pelmets can give the store a much higher, brighter appearance, but the pelmets should be mounted higher than is usual—say 8 ft. 6 in. from the floor—and they should be at least 18 in. away from the wall fixtures to give the maximum effect (see Fig. 3).

For really striking results, luminous wall areas can be provided, using translucent plastic panels lit from behind by fluorescent lamps. These panels can be designed specially for the particular store, with pictures and messages incorporated in the mould in which they are made and with relief sections picked out in colour (see Fig. 4).

For some years shop fittings in supermarkets have incorporated built-in lighting. Now, in the United States, an experimental display fitting with a luminous core has been used successfully in conjunction with ceiling spot-lights.

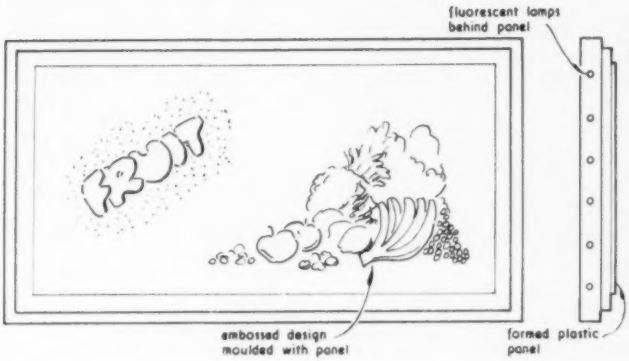


Fig. 4. Translucent panel, lit from behind by fluorescent lamps, for use as luminous wall areas to enhance visual impact.

Canopy lighting adopted at LDB Portsmouth employs fluorescent fittings built into perimeter of canopy and supplemented by tungsten fittings for end 'dumpies' (Courtney, Pope).

This arrangement has worked particularly well where the merchandise is transparent. On these fittings mineral waters and products in glass jars take on new life and sparkle, and the introduction of fittings of this type has produced increases in sales of up to 15 per cent (see Fig. 1).

Perishable foods need special attention. Fluorescent lamps of the warmer tones, combined with tungsten lighting, make meats look more appetising and give garden produce a fresh, crisp look. Baked goods and packaged foods look more inviting when they benefit from the brightness and sparkle of tungsten fittings. Spot lighting is essential also for the illumination of vertical displays, the fittings being installed at an angle of about 30 deg. so that items at the bottoms of the stacks are clearly seen. Pre-packaging rooms need levels of illumination that will minimize errors in weighing, prevent accidents and help speed the work. Good lighting is needed, too, in the stockrooms, which are often so badly lit that fragile goods are frequently broken.

At the 'check-out' positions, where the operatives have to give quick, accurate and cheerful service for long periods, special arrangements are required. High levels of illumination are needed, but the operatives' comfort must be considered. Tungsten lamps arranged directly over their heads will give them headaches, and the cooler fluorescent lamp is more appropriate in this area, provided the fittings are suitably arranged and the counter equipment and surrounding surfaces decorated in sympathetic colours.

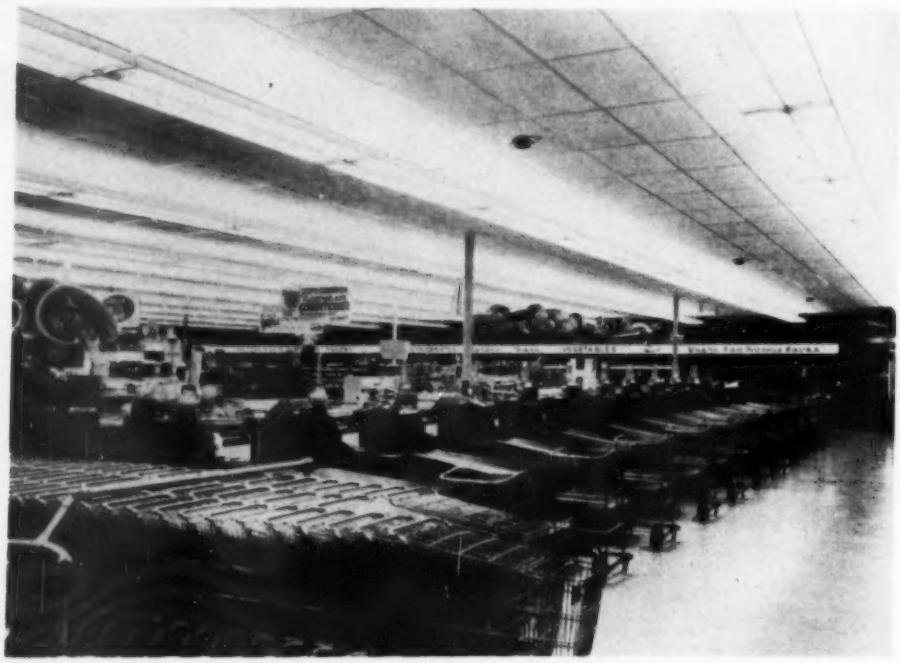
Maintenance

Although it is an essential service, maintenance is often overlooked. It is strongly recommended that operators of supermarkets keep clear records of the installation of their fluorescent lamps, changing them all at predetermined periods and cleaning the lighting fittings at least once a month. There are now in the UK firms specializing in the maintenance of lighting installations who, on a contract basis, will take on the responsibility for all lighting-equipment maintenance (from the ceiling downwards), including the replacement of lamps at pre-determined intervals. It is obvious that a supermarket should present a clean and bright appearance, not only when it is first opened, but at all times, and recent experience has shown that an increase in light output of over 75 per cent may occur after the lamps are changed and the fittings cleaned.

To sum up, the lighting of a supermarket must be an integral part of the complete design. Colour and brightness must be kept well in mind from the first sketch designs, and close collaboration is needed between owner, architect and lighting engineer. In designing the interior, the air-conditioning, ventilation, sprinklers, staff-call systems, etc., must all be combined with the lighting and the colour scheme to provide an efficient selling unit, attractive equally to shoppers and operating staff.

EXAMPLES

Overseas



American installation of 'Power Groove' lamps in louvred ceiling fittings gives an overall level of illumination of 160 lm/ft², increasing in certain areas to 240 lm ft² (General Electric).

This Dutch store illustrates the way the upward component of pelmet perimeter lighting may be used decoratively in silhouetting the canopy and its foliage decoration.

EXAMPLES

Overseas (continued)

Top left, the Epicerie Codac, Le Mans, shows the use of modular fittings supplemented by recessed tungsten spotlamps in the ceiling and behind the perimeter pelmets, whilst middle left, at Magasin Saveco, Lyon, is an example of ceiling mounted 120 cm. lamps augmented by 60 cm. fluorescent lamps behind pelmets and 150 W recessed tungsten fittings, giving 630 to 650 lux at 1m. above floor level (Mazda). Below, the use in this American supermarket, of filament lamps to provide 100 lm/ft² also results in about 80 per cent of the building's heat requirements being supplied by the lighting system (General Electric).

FLO LINE
by BENJAMIN
Flowing lines of light . . .
'Flo-Line'...in single, elegant fittings or coupled in flowing lines for hotels, stores, supermarkets, offices and all commercial areas.
Please write for illustrated brochure.
better lighting by BENJAMIN
THE BENJAMIN ELECTRIC LTD
TOTTENHAM · LONDON · N.17
Telephone: Tottenham 5252
Grams: Benjalect · Southtot · London
BIRMINGHAM
5 Corporation Street · Tel: Midland 5197
LEEDS
49 Basinghall Street · Tel: Leeds 25579
BRISTOL
Royal London Building · Baldwin Street
Telephone: Bristol 28406
Smee's 159

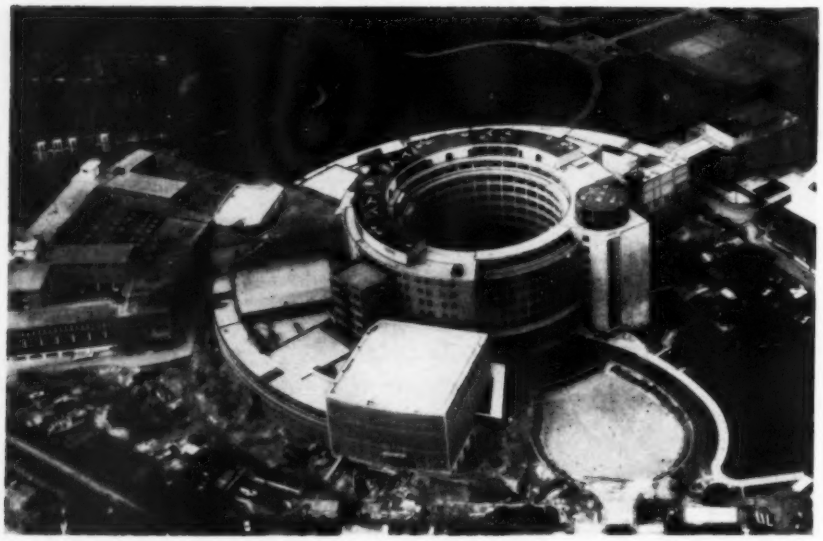


Fig. 1. Aerial view of the BBC's Television Centre, showing the inner circular main building and the outer ring of studios interconnected on the perimeter by the scenery runway. The extension to the left is the scenery and maintenance blocks and to the right the restaurant building

BBC Television Centre

General and special-purpose lighting installation in the world's largest television programme production building

THE BBC'S TELEVISION CENTRE in Wood Lane, Shepherd's Bush, is said to be the first such building in the world provided specifically for this purpose. Certainly its studios are the first the BBC has had designed and built expressly for producing television programmes, all previous BBC t.v. studios having been housed in buildings originally designed for other purposes.

The Centre stands on a 13 acre site, part of the larger area on which the Franco-British exhibition of 1908 was erected. In plan, the main building is in the form of a ring, to which at some future date a spur is to be added to cover a total area of 3½ acres, and it is said that the resultant question mark form was the architect's first conception of the building sketched on a used envelope. This ring is 500 ft. in diameter, enclosing a garden courtyard 150 ft across. At ground floor level, the circle is pierced by a colonnade giving access to entrances on the north and south sides of the building.

In plan the main building is arranged in three concentric circles, the outer two having been left incomplete to create a large forecourt facing the entrance colonnade. The inner ring, rising seven storeys above ground level, is occupied largely by offices and conference rooms, except on ground and first floors where it is devoted to assembly areas, green rooms, dressing rooms and television engineering departments associated with the seven studios which comprise the next outer ring of the plan. These studios range in size from 10,800 ft² to 3,500 ft² (apart from two small presentation studios used for announcing and person-to-person interviews). The largest is more than 50 ft high and contains a pit 7 ft 6 in. deep which can be fitted with water for aquatic shows. Between the studios are wedge-shaped areas occupied by control rooms, equipment stores, and similar service areas.

The outer ring of the building includes a covered scenery runway which provides an easy and rapid means of conveying scenery and properties to each studio. The runway is linked by a covered way to a separate scenery block, which has been in use since 1953. There will eventually be two other separate buildings—a restaurant block which is already in use and linked to the main building by bridges and a tunnel—and a works block yet to be built.

Construction

The main building is constructed over a ground slab covering its entire area; a 5 ft deep space has been provided between the slab and the basement floor above to accommodate the Centre's extensive service runs. The inner, multi-storey ring of the building has a steel frame, with long-span, deeply-ribbed concrete floor slabs supported on circumferential beams. The latter are arranged to span comparatively short distances and are consequently only a few inches deeper than the floor slabs they support, thus simplifying the above-ceiling service runs.

The studios are, structurally, no more than acoustically insulated large boxes. Massive walls, some as much as 2 ft 3 in. thick, are constructed from beams and columns of reinforced concrete with brick in-filling in which ducts for services have been incorporated. Concrete roofs, covered by a 6 in. lightweight screed finished with asbestos tiles, are carried on asbestos-sprayed welded steel trusses, the latter being designed to carry the scenery and lighting equipment loads and to provide a series of catwalks for maintenance access.

External cladding is mainly of brick, with the soffit and columns of the colonnade faced with mosaic. Internal finishes include extensive areas of acoustic treatment; walls and ceilings of studios, control rooms, band-practice and similar rooms are covered with a specially developed fireproof, sound-absorbant material, held in position by wire mesh.

The Centre is, virtually, a factory manufacturing television programmes and it is as an industrial, rather than a commercial, building that it should be judged. The circular form is, of course, unusual; being usually associated with a romantic rather than a practical approach to architecture, it more often than not creates extraordinary difficulties in detailed design. In this instance, its adoption is fully justified on purely practical grounds, having presented an arrangement in which the people who

use the building are concentrated in the inner areas where circumferential walking distances are short and where there is a simple outward radial progression from entrances to studios, whilst scenery and its movement is kept to the periphery, where the greater travelling distances involved can be offset by the use of mechanically-propelled vehicles. From the aesthetic viewpoint, this arrangement has resulted in massing which places the highest part of the building at its centre, whilst from the daylighting viewpoint, offices in the upper storeys obtain natural light both from the inner walls overlooking the garden courtyard and from the outer walls rising above the roofs of studios and scenery runways.

Artificial Lighting

Artificial lighting in the Centre falls naturally into two distinct categories—the general-purpose installation as a whole and the much more specialized studio production lighting. For the working areas generally, the aim appears to have been simplicity; the immediate effect beyond the entrance hall is that the same fitting has been used throughout.

This ubiquitous general-purpose fitting is a semi-recessed modular unit designed by the BBC's installation department and combining four basic demountable components. The carcase is a 2 ft square plaster box, flush fitted into the ceiling and supplied by Clark and Fenn as part of their contract for the acoustic tile ceiling. The gear tray is of Revo Electric Co's manufacture, using their polyester-resin-filled gear; lamps are warm-white, in both reflector and non-reflector versions; the diffusing plastic panel is Arrow Plastics ·030 pin-spot 'Perspex'. The overall effect is neat utility.

The standard lamp arrangement within the fitting is of four 20 W or 40 W lamps connected in a lead-lag circuit. Fittings employing this arrangement are provided in offices as required to achieve an average level of 20 lm/ft². For corridors, and other areas where illumination requirements do not call for the standard arrangement, two or three 2 ft 20 W or 40 W reflector lamps are used. Provision is also made within some fittings for tungsten lamp emergency lighting.

Fittings are connected individually by means of Bulgin plugs and sockets from which t.r.s. flexible metallic cables are taken back to a connector box mounted on the structural slab capable of supplying up to five fittings. In this way, it is possible to re site fittings with minimum alteration to the permanent wiring.

In studio, programme and other control rooms, this general illumination is supplemented by directional control-desk lighting provided from special, high cut-off fittings designed some seven years ago specifically for this application. As realized from the view of it in Fig. 11, the fitting provides an almost vertical beam of light, eliminating virtually all spill on to the picture monitor screens, to maintain the critical viewing conditions required for examining picture quality.

Decorative Features

There are six or seven areas whose nature demands distinctive lighting treatment: entrance hall and associated lift foyers, south hall and stairway, restaurant block, staff recreational club and visitors' reception and directorate suites on the sixth floor. The entrance hall, on the north side of the ring, is a spacious two-storey area rising 26 ft to the ceiling. Suspended some 2 ft below the ceiling is a curved metal framework creating a diamond-pattern grid.

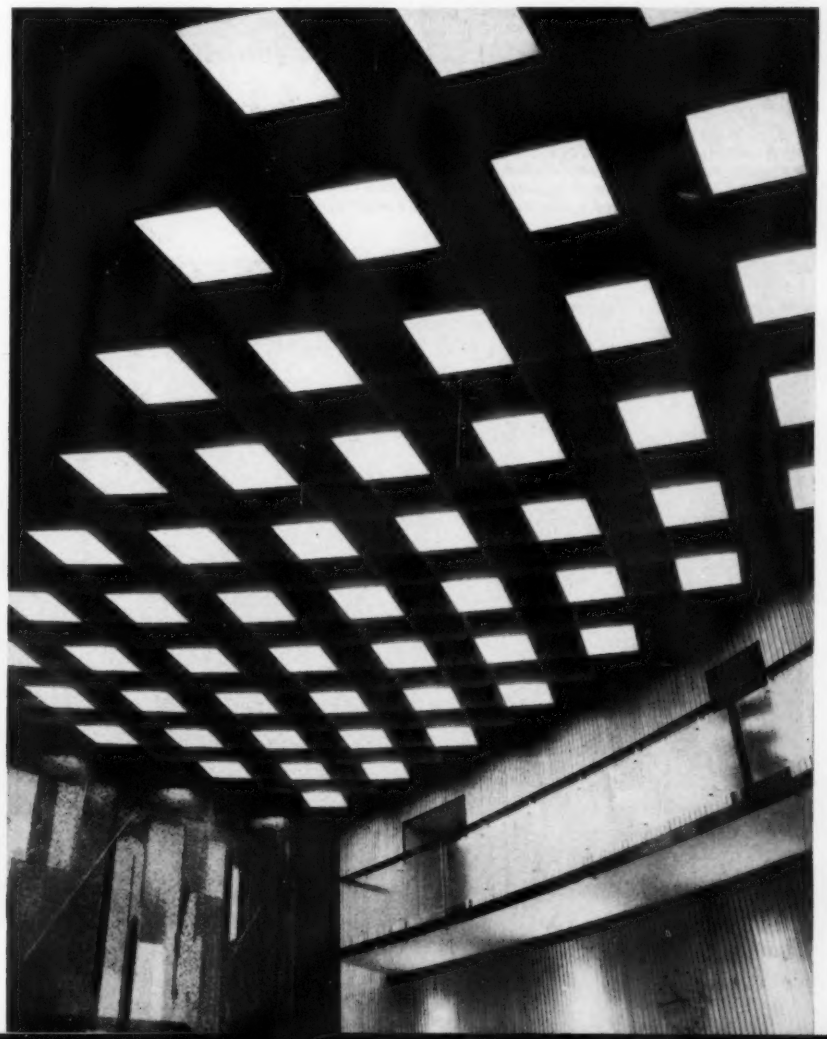


Fig. 2 (below). The entrance colonnade showing the concealed lighting above the cornice. Fig. 3 (right). The entrance hall ceiling with its diamond-shaped grid concealing fluorescent fittings and spot-lighting lanterns

Fig. 6 (above). A star dressing room illustrating the mirror lighting surround. Fig. 7 (below). Slotted trays used with inverted fluorescent reflector lamps to light the lift halls

Fig. 4 (above, left). The sawtooth wall of the south hall stairway concealing vertical fluorescent lighting screened by 'Perspex' tiles. Fig. 5 (below). The restaurant with its flush ceiling fluorescent lighting on each side of the beams supplemented by decorative tungsten fittings

Alternate panels are fitted with opal 'Perspex' and lit from above by means of fluorescent tubes. Also concealed above the grid are a number of spotlighting lanterns provided for use when it is desired to televise visitors arriving at the centre. The main lighting is further supplemented by a number of Rotaflex decorative fittings along the side wall over reception desks.

In the lift foyer off the entrance hall, and in the upper lift halls, use is made of rectangular aluminium pans, decorated with slotted perforations on their undersides (Fig. 7). The fitting conceals six 5 ft reflector lamps which are mounted with the reflecting area downwards, so that most of the light output is directed upwards on to the ceiling.

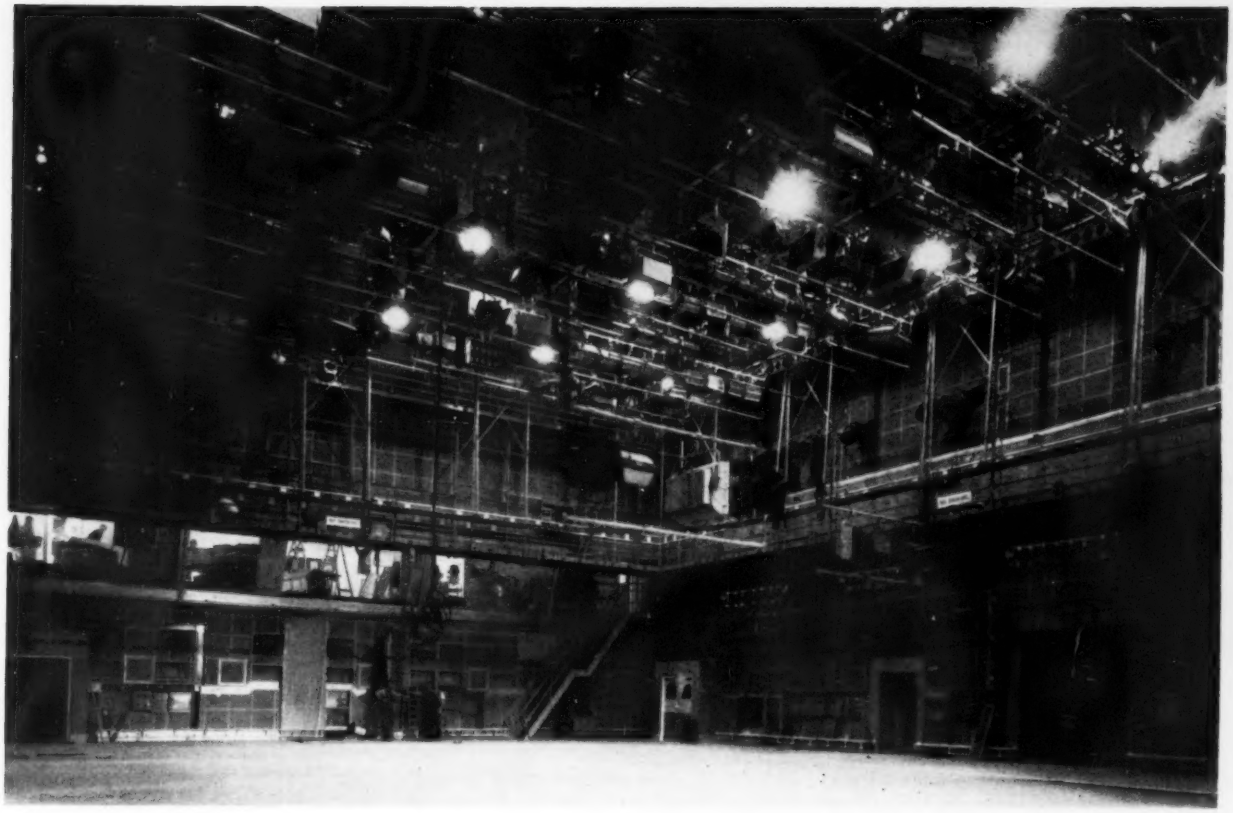
In the south hall, the staircase has been suspended clear of the sides and glazed front of the well, to present side-wall surfaces rising unobstructed through the height of the building. The surfaces of the side walls have been given a 'sawtooth' form, with the inclined component finished in plaster and the right-angle component, which looks out through the glazing on to the courtyard, is of 3 ft long reeded opal 'Perspex' tiles. Behind the tiles are installed vertical 8 ft reflector lamps, mounted on purpose-made narrow spines.

The restaurant comprises a cafeteria section over the whole of its lower floor and a waitress service section as a gallery of about half the total area. One wall is wholly glazed to provide a high level of natural lighting and a view overlooking a nearby park. Artificial lighting is generally by fluorescent lighting supplemented by opal glassware pendants on the window side of the gallery. The fluorescent lighting is unusual, comprising transverse runs of diffusing panels mounted flush with the ceiling and sited each side of the beams, and housing colour-32 coated lamps.

Subdued tones have been achieved in the recreational club by means of indirect lighting, provided from cornice mounted fluorescent lamps along the window wall and cove lighting round the bar canopy. A direct-lighting element is introduced by means of slats on the under side of the cornice over the entrance area. The bar itself is served by recessed internally-silvered lamps mounted in the soffit of the canopy and beyond over bar working area.

For the visitors' reception suite, specially made troffer fittings are used which depart from the standard square form in recognition of the circular plan of the building. The main reception suite, overlooking the garden court, follows the curve of the building; the fittings are mounted radially, and although comparatively narrow, housing but one lamp, they are 4 ft long and are consequently tapered, requiring special construction of plaster frame, control gear tray and plastic diffusing panels.

A further special lighting requirement, apart from the studios themselves, is provided by dressing rooms. Here, the



importance of correct colour rendering has been recognized in the general use of colour-32 coated lamps. In both star and communal dressing rooms, mirrors are lighted by means of a surround of 2 ft reeded opal 'Perspex' diffuser fittings, with general lighting from the standard ceiling diffuser panels. In make-up rooms, the additional lighting (up to 100 lm ft^{-2}) required on the working areas is provided by ceiling-mounted twin 5 ft batten fittings arranged in a continuous ring round the room.

Fig. 8 (above). General view of studio 3, showing the lighting equipment mounted on the hoists in the raised position. Fig. 9 (below). A presentation studio giving a closer view of the production lighting lanterns, notably the ten-lamp flood unit with ten 200W internally silvered tungsten lamps

Production Lighting

The studio production lighting reflects the BBC's latest practice in both lighting equipment and control systems which have been developed jointly with Strand Electric. The system is based on electro-mechanical, servo-driven, resistance and transformer dimmers, having the basic advantage of inherent inertia over all-electric systems.

As engineers familiar with studio lighting techniques will know, an installation comprises two separate parts—a lighting circuit which terminates in the studio for the eventual connection of a lantern, and a control channel which incorporates an energy regulator and its position control devices. The two components are brought together by means of cord plugs and sockets, grouped together in a patch panel, on which any control channel may be connected to any lighting circuit.

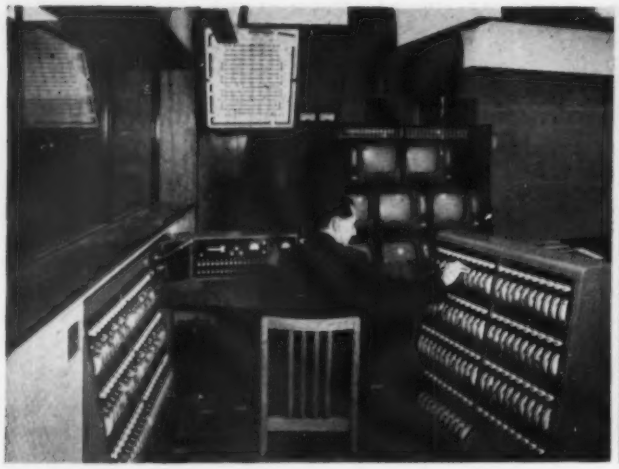


Fig. 10 (left). The lighting control desk; immediately facing the operator are the twenty memory buttons; to his right and left, the dimmer levers and above the hoist layout mimic panel indicating the deployment of the lighting at any given time. Fig. 11 (right). The central apparatus room showing the central control desk which is the focal point of programme broadcasting. Also illustrated are the general-lighting diffuser fittings and the high cut-off monitor-viewing fittings

In the studio so far completed (no. 3), which is a general-purpose studio of 8,000 ft² floor area, 44 ft ceiling height and eventually to be one of three of this size, there are 510 lighted circuits, all but 20 of 2kW rating, single phase, the exceptions being of 5 kW each. The circuits terminate in 25 amp BBC-type rubber moulded socket-outlets mounted on 8 ft suspended tubular bars on which the lanterns are hung. Four 2 kW circuits are provided on each bar, distributed between two single outlets and two double outlets. The bars are suspended from motorized hoists mounted on the structural trusses 35 ft above the floor level and providing a vertical lift from 5 ft to 32 ft above floor level. Circuit connections to the bars are made by flexible cable coiled round each suspension rope.

About half the lanterns installed for use are 2 W and 500 W Fresnel spots, pole-operated for pan, tilt, focus and barn-door adjustment. In addition there are profile lighting lanterns and special 4 kW projectors for such optical effects as back-of-screen projection. The remaining lanterns are special 2 kW floodlighting units, comprising a rectangular trough housing ten 200 W internally-silvered floodlamps, and a new design of 500/1,000 W cyclorama lantern using tubular Class FL incandescent lamps.

Control is effected from a lighting supervisor's desk in a room shared with a vision supervisor, and having windows overlooking both the studio and the producer's control room, to maintain visual contact without introducing the disturbance of the inevitable conversation. Both supervisors share one set of monitors. The lighting desk, which controls 120 transformer dimmers of 2 kW rating, eighteen of 5 kW rating and ten switched channels without dimmers, utilizes luminous on-off push-button switches to select desired circuits, which operate the circuit contactor through a reverser relay and indicate its state by means of a pilot lamp built into the button head. The buttons actuate reverse relays, one push energising the circuit and lighting the pilot, a second push disconnecting the circuit and extinguishing the pilot. Simultaneously or alternatively, at the operator's will, the same push can be used to select such circuits as are required at that moment to operate on dimmers, this selection being indicated on an adjacent green pilot lamp.

Since television production involves grouped rather than individual lanterns, the corresponding grouping of circuits is effected by a series of twenty memory buttons on the centre control desk, capable of memorizing through a relay action the combination of dimmers and/or contactors selected. When the buttons are subsequently pressed, until otherwise reset, they recall both in the studio and on the switchboard that desired combination. Two dimmer levers, coloured red and blue, are provided to each control channel and operate in conjunction with the dimmer servo control to enable two lighting levels to be preset ahead of the actual level in use. These levels of course, only affect circuits selected at the time, hence each of the twenty groups memorized may have two levels of lighting preset in advance of that actually in use. In practice, two levels alone are found to cover normal requirements and these can always be shown on the dimmer levers; where more than this is required, provision is made to indicate on a dial the position of any dimmer whose levers no longer represent its position at that time.

The patch panel is also novel in that the cords, instead of being associated with circuits, are connected to dimmers, and consequently terminate in jack sockets to provide the necessary protection against accidental contact and its risk of electric shock. This arrangement confers greater compactness since the number of control channels (158) is much less than the number of circuits, and also reduces the number of cords to maintain or confuse. The sockets are designed to discriminate between 5 kW and 2 kW circuits, to avoid a 2 kW channel being connected to a 5 kW circuit and thus overloading the channel.

Acknowledgments

Thanks are expressed to the British Broadcasting Corporation for permission to publish this article and to Mr K. Ackerman of their Planning and Installation Department for assistance in its preparation. Figs. 2, 3, 4, 5, 7, by I. S. Moseley, staff photographer, Revo Electric Co Ltd.

Architect:
Graham Dawbarn, CPE

Consulting civil engineer:
M. T. Tudsberry, CBE

Architectural consultants:
Sir Howard Robertson, ARA, PPRIBA
Sir William Holford, MA, FRIBA

Main contractors:
Higgs and Hill Ltd
George Wimpey and Co Ltd

Electrical subcontractors:
Giles Electrical Co Ltd (studio equipment)
Barlow and Young Ltd
Matthew Hall and Co Ltd
Duncan Watson (Electrical Engineers) Ltd

Studio lighting equipment suppliers:
Strand Electric and Engineering Co Ltd
General Electric Co Ltd
Mole-Richardson (England) Ltd
Knight Construction Co Ltd

General lighting equipment suppliers:
Revo Electric Co Ltd
Atlas Lighting Ltd
Arrow Plastics Ltd
F. H. Pride Ltd
Philips Electrical Ltd

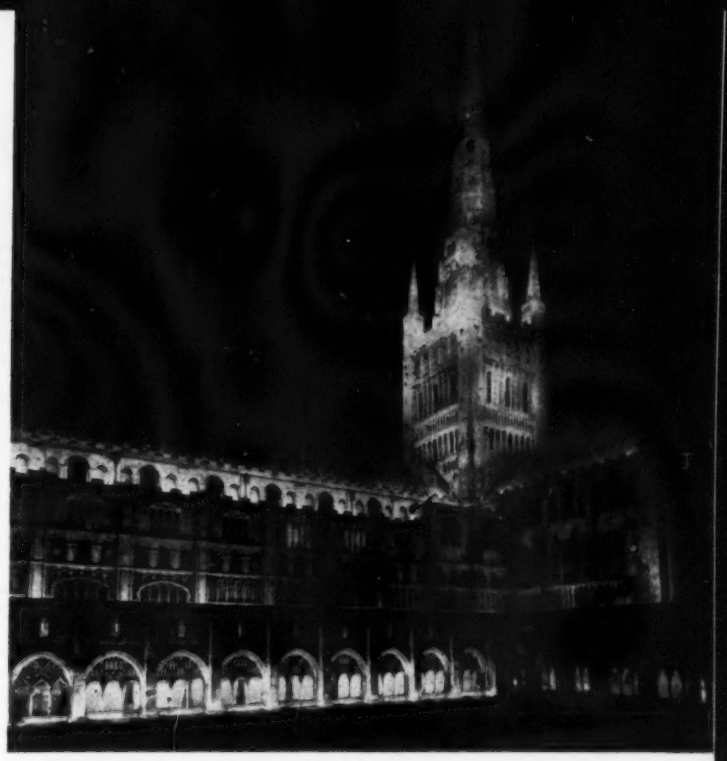
'Son et Lumière' at Norwich and Portsmouth

Contrasting auro-visual displays highlight 'The Victory' and an historic cathedral dating from William the Conquerer

IT IS A REFLECTION of the increasing interest of the general public in lighting that 'Son et Lumière' displays are rapidly growing in popularity; it is a further reflection of technical adaptation that the original system imported to this country, in which lighting changes were effected manually in response to cues in the spoken narration, should have soon been made wholly automatic in operation. This latter development, better known by its commercial name of 'Aurama', was first seen last year when its developers, Atlas Lighting Ltd, staged a pilot presentation at the Electrical Engineers' Exhibition. Its latest application, in a 'Son et Lumière' spectacle at Norwich Cathedral, marks its first full-scale commercial use and illustrates the remarkably dramatic effects which can be achieved in this way. The installation also provides an interesting contrast with a 'Son et Lumière' display of HMS *Victory* at Portsmouth, which has recently been completed but where the earlier manual technique was employed.

Norwich Cathedral lends itself particularly well to 'Son et Lumière'. The building has had an eventful history since its beginnings under Bishop de Losinga just before the turn of the eleventh century, continuing to as recently as 1942, when it was damaged by bombing. Its architecture is one of the most brilliant examples of Norman building, enhanced by later additions, notably, in the fifteenth century, of sculptured stone roofs and a 195 ft spire on the 120 ft Norman tower. A contrast of lofty spire with long nave also assists the dramatic appeal of the lighting. A final advantage is that an audience of up to 2,000 may be accommodated in the cloister garth and provided with a superb view of the cathedral.

The spectacle, produced by Ian Emerson with the script by John Mortimer, runs for about 40 minutes and involves some 250 lighting and special-effects cues. These are placed on the tape by simply removing a small area of the oxide film at the required places and in this way the lighting changes are automatically and consistently synchronized with the narration. During operation, the tape is passed through photoelectric cueing heads which emit a pulse at each cue-spot. The pulse is routed through the dimmer control unit to a standard 50 way selector switch, from which a bank of thyratron dimmers is controlled. The dimmer control unit comprises two continuous bands of 35 mm film medium each carrying six tracks. One set of tracks is used to distribute cues to the thyratron dimmer selected to operate that cue, whilst the other is used to control switched circuits or may be employed to transfer dimmer banks from one circuit to another.



Dramatic portrayal of Norwich Cathedral in the finale of the 'Son et Lumiere' spectacle when the building is illuminated by 80 kW of lighting.

Nelson's famous ship 'The Victory' as she is seen in the 'Son et Lumiere' presentation at Portsmouth.

The lighting installation itself utilizes a mixture of tungsten and filament lamp fittings, having a total electrical load of 80 kW, and ranging from 3 kW Infranor projectors, used to illuminate the spire, to miniature flood-lighting lanterns of 6 W, 24 V. The electrical installation was carried out by the Eastern Electricity Board.

The installation at the *Victory* follows the story of that famous ship from prison hulk to flagship, and, as at Norwich, the subject has a visual appearance readily adaptable to lighting changes. A total lighting load of 65 kW has been installed by Atlas of which only a few low voltage, low power lamps were permitted on the vessel itself in view of the fire risk. Banks of weatherproof fluorescent fittings with lamps of various colours have been installed close to the hull, supplemented by other fittings and 2 kW tungsten flood-lighting lanterns for silhouette lighting. A second bank of lanterns has been mounted behind the audience approximately 200 ft from the ship on a 50 ft high roof.

Hanover Fair 1960

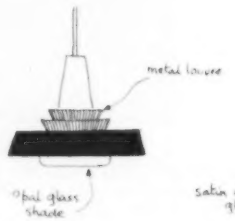
The Hanover Fair claims to be the most important trade fair held in Europe. At the 1960 Fair (April 24 to May 3) about 3,900 German manufacturers and 840 overseas manufacturers showed their latest products to over one million visitors. The majority of lighting exhibits were shown in the building erected by the German lighting industry for the purpose in 1958; there were 250 exhibitors of lighting equipment, only 17 of whom were from countries other than Germany. Although it would appear that there were few major technical developments to be seen there were nevertheless a number of points of interest which are mentioned in the two articles below.

1 Hanover Revisited, by R. L. C. Tate

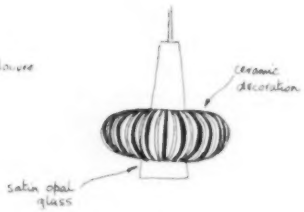
IT IS A COMMONPLACE that the average electrical retailer in this country has no idea how to display lighting fittings but stuns his customers with a forest of lighted pendants so closely planted that it is impossible to see any of them properly. That this technique is not confined to the British Isles was evident at Hanover where the majority of exhibitors in the five-storey building devoted to the lighting industry crammed as many of their wares on to the ceiling as they could. An exhibition of such a size is bound in any case to cause some mental indigestion; when the greater part of the exhibitors base their displays on the Noah's Ark principal it is even more difficult to achieve a coherent picture. It is not, indeed, until after one has left the exhibition, that one can hope to marshal one's visual impressions in any sort of order.

German fittings manufacturers appear to fall into two main catagories: those making for the home market and those who look farther afield. In the former group I place the great majority of firms providing a huge array of glass, plastic and fabric creations, of which it is perhaps kindest to say that they appear to an Englishman typically German. It is only in the case of a few, such firms as Hesse Leuchten, Kaiser, Staff und Schwarz, Peill und Putzler and Bag Turgi, that any clear indication of design trends can be seen among the welter of writhing brass and manifold shapes and colours of glass and plastic.

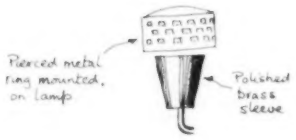
The use of two glasses, usually a satin-opal inner shade with a coloured glass, or ceramic decorated outer, is now well established where filament-lamps are concerned. On the whole, coloured glasses tend to be rather cruder in tint than their Scandinavian counterparts, and my own reaction is in favour of the metal or ceramic decorated glass outer as in the two examples I have sketched (1 and 2). A large number of firms are using pierced or



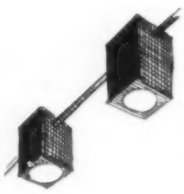
1



2

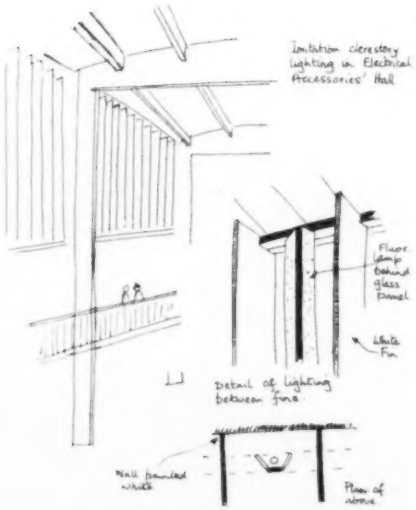


3

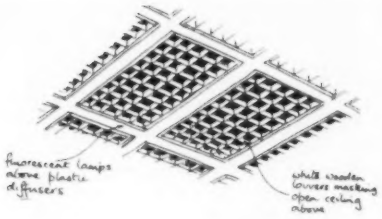


4

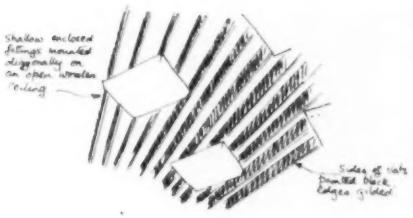
5


Imitation clerestory lighting in Electrical Accessories' Hall
Fluor. lamp behind glass panel
White Fin
Detail of lighting between fins
Wall painted white
Plan of above

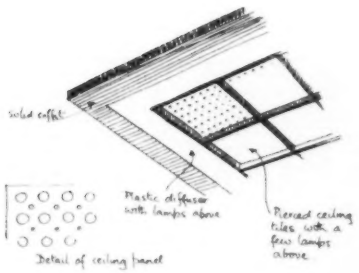
6



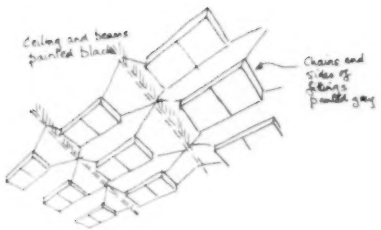
7



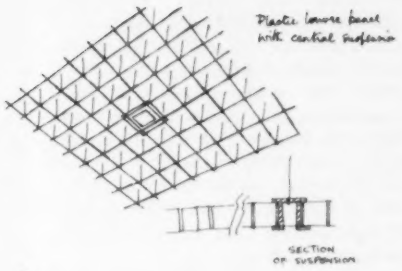
8



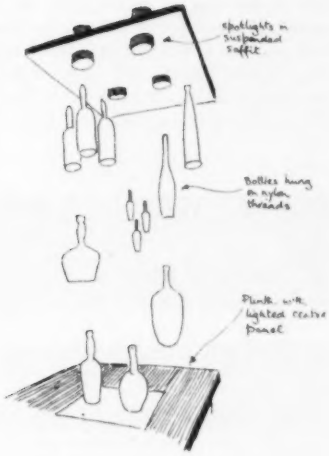
9



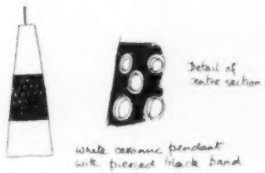
10



11



12



expanded metal, both by itself and in conjunction with glass shades. In many cases, as in my sketch (3) rather odd proportions spoil an otherwise good idea, and indeed, most of the metal shades exhibited suffered from too complicated design.

It is interesting to note, however, that the German equivalent of the COID picked some of the simplest forms of lighting fittings for exhibition in the 'Gute Industrieform' pavilion. The idea of 'light-bricks', luminous geometrical shapes applied to a wall to produce a highly textured surface, is novel and interesting but one is inclined to wonder whether it is economically sound to use filament lamps for the purpose. The neat black boxes (4) housing reflector lamps and linked to one another with conduit, are not entirely original but quite effective: one can imagine them used in large numbers on a dark ceiling.

There seems to have been no marked development in the fluorescent fittings field. A great many variations of the continuous line type of fitting, both with totally enclosed diffusers and louvred reflectors were to be seen, but these did not appear to differ markedly from those seen in previous years.

The fair covers all sections of German industry, and as one would expect, the lighting of some sections had considerable interest. Halls devoted to heavy engineering, woodworking and similar matters were not very productive of lighting ideas but some of the sketches made in the Electrical Accessories and Office Machinery Halls and in the 'Messehaus' may prove of interest.

The greater part of Hall 11, devoted to electrical accessories, is on two floors, but in the centre is a large clear area rising above both and apparently lighted by daylight coming through clerestory windows screened by vertical 'brise soleils'. On closer inspection, however, one sees that the lighting is entirely artificial, for between each fin a vertical glass and metal panel conceals fluorescent lamps casting light on the white painted wall behind (5). This installation is not new, and it speaks well for its effectiveness (or ill for my powers of observation) that I did not notice it on my last visit two years ago.

On the gallery at the end of this hall, Siemens made use of nine rows of thirteen enclosed fluorescent diffusers mounted end to end on industrial trunking to suggest a gigantic sloping canopy. The space between the rows is not filled in, but a large name-board with letters outlined in white cold-cathode tubes are suspended from them.

Clever use was made of white painted louvres or wooden fins to suggest a ceiling in several stands in this hall. A stand showing switchgear had a ceiling broken up into rectangles by luminous beams (6) while the space between was filled with white painted

wooden egg-crating. Another (7) had black wooden fins with gilded lower edges running from front to rear, and square plastic 'cushions' arranged diagonally upon them. In a third, much smaller, stand (8) the basic lighting was provided from a luminous band of fluorescent lamps above diffusing panels, while the main ceiling was made of wooden or plaster-board panels pierced with a pattern of large and small holes through which light glinted from a few fluorescent lamps mounted above.

Most of the stands in the hall devoted to office machinery had large wooden egg-crating above them. Each cell was about a foot square and six inches deep, and where lighting was required it was confined to that square. The main ceiling of this hall was painted black and large rectangular fluorescent fittings hung from it on chains. The latter were painted grey and sprayed out at an angle from the corners of the fittings forming an interesting pattern against the dark ceiling (9).

One or two interesting lighting ideas were to be seen in the 'Messerhaus' devoted to jewellery, glass and ceramics. One very large showroom had an oval panel filled with polystyrene egg-crate louvring (10). Each panel was suspended from the centre by means of a square plastic 'bobbin' and a wire or nylon thread. It was virtually impossible to distinguish where the tiles were butted together. Subsequently I saw other examples in the town, where the suspensions were at the corners of the tiles and the joints between tiles were much more obvious, probably due to the accretion of dust. In the case of the ceiling in the Messerhaus, the plenum space was unduly restricted, and the lamps were arranged in chevron formation above the egg-crating, giving a 'water silk' effect on the plastic cells. A ceiling made of tiles with a half-inch square cell was suspended simply by nylon threads tied through small holes in the top of the louvre fins; this would, I imagine, lead to considerable maintenance difficulties.

In the Messerhaus too I saw a display of bone china in which coffee pots and teapots were lighted from within. This was most unsatisfactory as it completely flattened the modelling of the china, and since spouts and handles appeared unlighted, they did not seem related to the body of the vessels concerned. Far more fortunate was the display of glass bottles hung on nylon threads below four spotlights shown in my sketch (1). One stand showing ceramics even had ceramic pendant fittings hanging over it, which were, in fact, rather effective (12).

2 German lighting fittings at Hanover, based on information supplied by E. Wittig

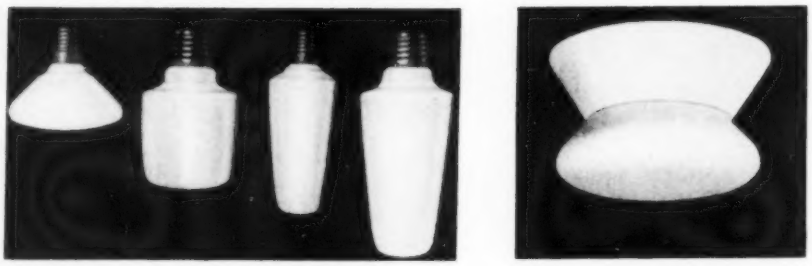
OF INTEREST IN THE sphere of domestic lighting were some new shapes of tungsten lamps designed by Prof Wagenfeld. These new lamps are available in sizes from 25 to 60-watt and have opal glass bulbs. They are intended for use without any shades or screens but as decorative elements themselves; a typical porcelain ceiling fitting with one of these lamps is illustrated.

Another noticeable development in the domestic range was in lighting glassware. In particular, new methods of treating the surface of glass have brought about interesting new designs and the use of two or three different shapes, colours or patterns of glass in the same fitting produces some very interesting effects.

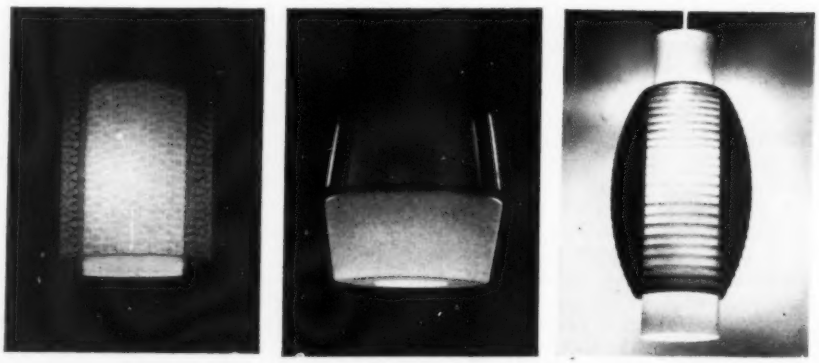
A new decorative element is the so-called 'Light-brick' which can be made in a variety of shapes and colours and applied to a wall, either indoors or out of doors, to give any desired pattern. Fitted with 60-watt tungsten lamps they can be made either dustproof or waterproof.

Commercial fluorescent fittings showed little change though mention might be made of two very slim single lamp fittings for indirect lighting, one for ceiling mounting and the other for wall mounting. The ceiling fitting has use in modern buildings where a fitting is required near a window but where the space between the window and ceiling is as a rule very limited.

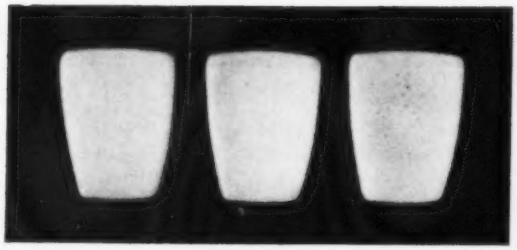
Readers of *Light and Lighting* are already aware that a great variety of street lighting luminaires are made in Germany; this was also evident at Hanover. The trend towards higher illumination levels on the road has

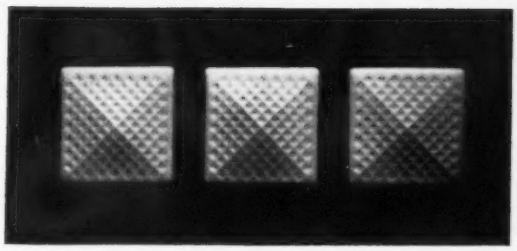


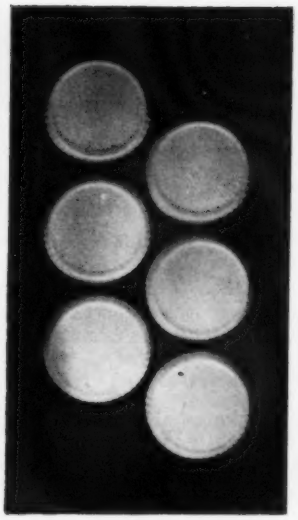
Left, tungsten lamps designed to give a new look in domestic lighting (Lindner, Bamberg). Right, a porcelain fitting using one of the new lamps.



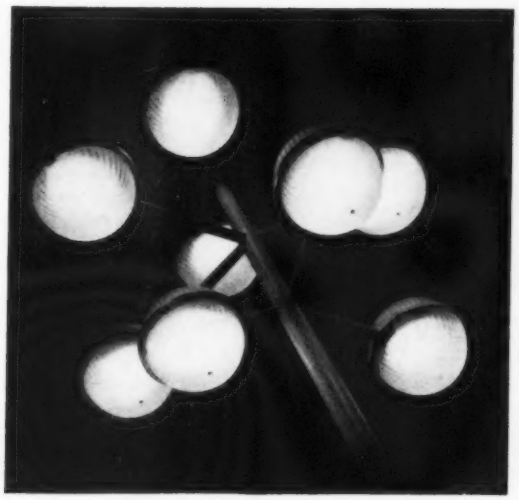
New designs in lighting glassware. The first two were designed and made by Peill & Putzler, Duren; the third was designed by H. Fuchs and made by Phönix, Konstein.

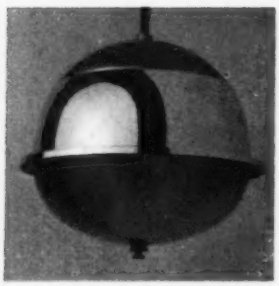


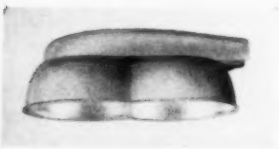


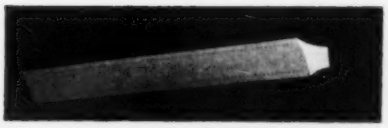


Three types of 'light-bricks' comprising opal glass covers and a waterproof aluminium alloy enclosure made by Ganterbrink, OHG, Menden/Sauerland.





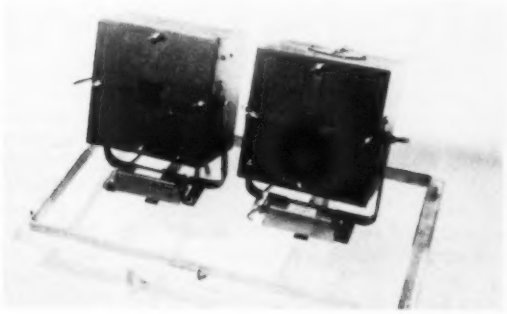




Shallow single-lamp fluorescent fittings for indirect lighting; top, for wall mounting; below, for ceiling mounting.

Above and right, four street lighting luminaires. The one above is for use with colour-corrected mercury lamps (AEG, Hameln). Those on the right are—top, for lighting large spaces and uses two 400-watt mercury lamps and one 200-watt sodium lamp (Hellux, Hanover); centre, for use with one mercury lamp and one sodium lamp each in its on reflector (Röhl, Regensburg); bottom, for lighting intersections or large spaces using either three 1,000-watt colour-corrected mercury lamps or three 400-watt mercury plus three 140-watt sodium lamps (Siemens-Schuckert, Erlangen).

led to the introduction of luminaires housing 1 or 2 kW colour corrected mercury lamps; some of these luminaires may also be used with a combination of mercury and sodium lamps—a current fashion for lighting large areas such as squares or road intersections. Also shown at the Fair were a number of post-top luminaires which can be used in any number on one column to light large areas. Several luminaires with enclosures made of polyester resin reinforced with glass fibre were shown and one or two fittings had transparent covers of a new plastic material, said to have high temperature stability, called poly-carbonate.



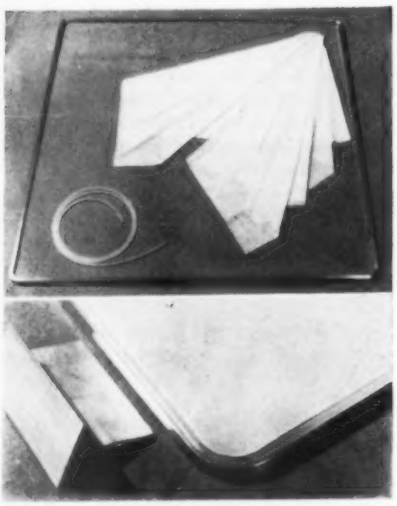
Left, fittings for floodlighting traffic direction signs using a mercury lamp the light output being controlled by adjustable reflectors and diaphragms, and a sign lit by these fittings on an autobahn (Schanzenbach, Frankfurt).

NEW PRODUCTS

Luminous ceiling in p.v.c. sheet

LUMINOUS CEILINGS have a number of advantages where evenly diffused shadowless lighting is required at high levels of illumination but its cost tends to limit its use mainly to commercial interiors. To extend its potential application, Lumenated Ceilings Ltd have recently introduced a new luminous ceiling whose cost (of approximately 5*s.* 6*d.*/ft² for supply and installation) is claimed to make it economic for use in a variety of industrial installations. Known as the 'Lumenated Westminster' ceiling, it is based on 3 ft square diffusing panels supported on a lightweight aluminium track suspended from the building structure. The diffusing medium is a translucent sheet of flexible p.v.c. specially developed to provide a stable and optically correct material. It can be supplied in a variety of grades, depending on the desired luminous transmittance; the maximum value is about 87 per cent. All grades are stated to be guaranteed against premature ageing, embrittlement or other deterioration. The sheet is stretched over a U-section aluminium frame and held in position by means of a core of thick-wall p.v.c. tube which is pressed into the channel. The diffusing panel so constructed is supported on all four sides by the flanges of an aluminium track of inverted T-section, suspended from the soffit of the structural floor. The underside of the track, being the only visible part of the framework, has been fluted; further decoration may be added by colour anodizing. Structural requirements are minimal, since the ceiling weighs less than 7 oz/ft². The use of aluminium eliminates additional surface protection whilst the p.v.c. is treated against static electricity. Cleaning is available under a contract service offered by the firm.

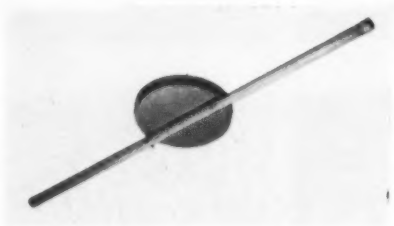
Lumenated Ceilings Ltd, Alliance House, Caxton Street, SW1.



Upper picture shows the component parts (p.v.c. sheet, core tubing and aluminium channel frame) of the new 'Lumenated Westminster' luminous ceiling; lower illustration depicts a corner detail of the assembled panel.

Centre-mounting fluorescent fitting

THE CONCEPT of a batten fluorescent fitting which holds the lamp at its centre so that the lamp ends project beyond the fitting is still rarely to be found in this country. It may be a sign of its growing popularity that a new fitting of this type has recently been introduced by New Estate Electrical Ltd. The fitting itself is a circular box, 3 in. deep and 13 in. diameter which houses the control gear. The lamp is held by two clips mounted on the outside of the box, whilst connections to it are concealed by end caps. Both box and caps are supplied with a stove-enamelled paint finish in a variety of colours. The box may be mounted direct to the ceiling or suspended on a single ¾ in. conduit. Retail price of the fitting is 6 gn. complete with lamp.



The centre-mounting fluorescent fitting from New Estate Electrical is offered with a choice of colour finishes for the control gear case and lamp end-caps.

New Estate Electrical Ltd, Brunswick St, Leeds.

Photoelectric lighting controller

COMBINED PHOTOELECTRIC AND TIME control of lighting installations may be obtained from the new 'Mayklite' automatic lighting controller. Two versions are available, one incorporating the photoelectric cell within the control unit case, the other providing a separate sensing head for the cell. With the latter arrangement, up to three sensing heads may be connected to one control unit, enabling the daylight level in separate parts of the building to be monitored, and the artificial lighting for those areas controlled accordingly. The photoelectric cell controls the operation of a relay, with a contact rating of up to 10 A, for the switching of the lighting circuit.

Both versions can be supplied with a time switch fitted as an extra component in the control unit to give time control of the lighting circuit in addition to the photoelectric control. The control unit with time switch and p.e. cell, housed in a case of 9¼ in. by 6¼ in. by 3¼ in. is priced at £18; without p.e. cell, it is £16, the sensing head 1¼ in. by 3½ in. by 2 in. being £3 extra. Equivalent units without time switches are £10 and £7, the case dimensions being 4 in. by 4 in. by 3 in.

Mayra Electronics Ltd, 551 Holloway Road, London, N19.

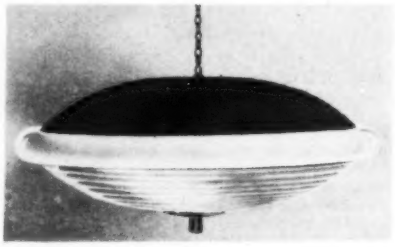
Lamps for projectors

SIEMENS EDISWAN have extended their range of projector lamps by two types for 8 mm cine projectors and three types for 35 mm still projectors. The 8 mm lamps (types A1/186 and A1/193), rated at 100 W, 12 V, are unusual in employing a specially constructed filament whose coils are nearly rectangular in shape. This ensures that maximim utilization is made of the light, which is directed into a uniform beam along the projector axis. The 35 mm lamps (types A1/182, A1/178 and A1/180) are fitted with valve bases. Their ratings are 150 W, 300 W and 500 W respectively, at standard mains voltages.

Lamps and Lighting Department, AEI Radio and Electronic Components Division, 38-39 Upper Thames Street, London, EC4.

New fittings in orbit

SATURN IS THE NAME given to two new fittings designed by Bull Electric Ltd, around the 40 W and 80 W circular fluorescent rubes. These 'satellites' are basically simple units, comprising a light alloy framework with chain suspension, which carries the tube round its perimeter and provides internally the fixing for choke and control gear. The fitting is then completed by upper and lower plastic bowls which conceal the assembly to leave only the lamp visible, and which are available in a number of colours. Prices are £6 19*s.* 6*d.* and £6 9*s.* 6*d.* for 80 W and 40 W sizes respectively.



Particularly suggestive of satellites is this Bull Electric 'Saturn' fitting making use of the circular fluorescent lamp; upper and lower plastic bowls are available in several colours.

J. Bull Electrical Ltd, Sutton Road, Eastbourne.

LIGHTING ABSTRACTS

OPTICS AND PHOTOMETRY

870. A study of glare from very large sources. 612.843·367
R. G. HOPKINSON and R. C. BRADLEY, *Illum. Engng.*, **55**, 288-294 (*May*, 1960).

A very large light source, such as a window or a luminous ceiling, in the field of view materially influences the adaptation level, and consequently invalidates the use of discomfort glare formulae derived from studies with sources of much smaller apparent size. To provide corresponding data for such large sources, investigations have been initiated at the Building Research Station and at Cornell University using glare sources comprising banks of closely packed dimmable fluorescent lamps behind opal plastic screens. Preliminary results obtained with the British apparatus with three levels of background luminance are reported, one significant finding being that with these large sources the discomfort glare is more critically dependent on small changes in the source luminance. P. P.

612.843.36
871. Contrast sensitivity of the human eye with different illuminants.
P. JAINSKI, *Lichttechnik*, **12**, 355-359 (*June*, 1960). *In German.*

The luminance difference required for the detection of a test disc slightly brighter than its surroundings was measured by a number of observers for four different kinds of light, viz. (i) tungsten, (ii) sodium, (iii) fluorescent and (iv) colour-corrected mercury. The field was viewed binocularly with the natural pupil and the luminance was varied from 0.001 to 60 foot-lamberts. The curves found were of the usual form and were almost coincident for (i), (ii) and (iv). The white fluorescent, however, gave a rather better sensitivity at low values of luminance. J. W. T. W.

LAMPS AND FITTINGS

621.327.534
872. New designs for mercury lamps increase their usefulness.
W. S. TILL and M. C. UNGLERT, *Illum. Engng.*, **55**, 269-278 (*May*, 1960).

The introduction of quartz mercury lamps with a new type of oxide emission material has resulted in a marked improvement in lumen maintenance (giving an economic life rated at 9,000 hours) and easier starting at low temperatures. In fact, the new lamps have a lumen maintenance superior to any other type of vapour lamp, including fluorescent lamps. Other design improvements include new quartz sealing techniques, simpler arc tube support structures, new materials for ballast resistances, harder outer glass envelopes, etc. Economic comparisons between the new lamp, a lamp having a quartz arc tube with conventional thorium-tungsten electrodes, fluorescent and tungsten lamps demonstrate the superiority of the new design, an 18 per cent saving in annual cost of light being possible. P. P.

621.327
873. Tensile and thermal stresses in the envelope of high brightness high pressure discharge lamps.
W. E. THOURET, *Illum. Engng.*, **55**, 295-305 (*May*, 1960).

High pressure mercury or xenon arc lamps combine the high luminance of the carbon arc with the advantages of an enclosing jacket. The high internal pressures of these lamps (up to 75 atmospheres) together with the high operating temperatures (600-900°C) mean that the quartz envelopes are subjected to excessive tensile and thermal stresses. Calculations are given for the stress distributions in three types of high pressure discharge lamp, and ways are described whereby the data can be used to determine optimum lamp designs and to estimate the practicability of new lamp types and materials. P. P.

621.327
874. Design factors of extra-high-output fluorescent circular cross-section lamps.
C. J. BERNIER, *Illum. Engng.*, **55**, 282-285 (*May*, 1960).

Very high brightness fluorescent lamps having a 1 in. diameter cylindrical envelope have been made possible as the result of using argon-neon and argon-helium gas fillings. Loadings of 25 watts per foot can be obtained with a rated life of 7,500 hours. With reflector-coated lamps, surface luminances of 6,400 footlamberts and above can be obtained. The small diameter and cylindrical cross-section make these lamps particularly suitable for controlled distribution of light from specially designed reflectors. P. P.

621.327.534
875. Design requirements for high lumen maintenance and easy starting of mercury lamps.
E. C. MARTT, K. GOTTSCHALK and A. C. GREEN, *Illum. Engng.*, **55**, 260-265 (*May*, 1960).

End blackening and the consequent lumen depreciation of short mercury arc tubes have been materially reduced by replacing the customary thorium-tungsten electrodes with oxide electrodes in which the main emission materials are barium and calcium. Reduced electrode temperatures with an increase of up to 28 per cent in mean lumens (over 9,000 hours) are obtained. The effect of the argon filling pressure has also been examined. Decreasing pressure results in a decrease in the starting voltage at low temperatures and reduced lumen maintenance throughout life. P. P.

621.327.534.15
876. New parameters for high frequency lighting systems.
J. H. CAMPBELL, *Illum. Engng.*, **55**, 247-254 (*May*, 1960).

The results of recent laboratory developments in the use of high frequency supplies for the operation of fluorescent lamps are presented in the form of a progress report for the advance information of potential users of this equipment once it becomes generally available. The influence of supply frequencies up to 20 kilocycles on the operating characteristics of fluorescent lamps are described, while alternative forms of supply distribution using semi-conductor inverters are dealt with. P. P.

LIGHTING

628.971
877. Recommended practice of outdoor parking area lighting.
Illum. Engng., **55**, 307-312 (*May*, 1960).

Prepared by a Sub-Committee on the Lighting of Service Stations and Parking Areas of the American IES, this Recommended Practice gives general guidance on the illumination requirements, types of light source and lighting equipment, location and spacing of poles, etc., for the lighting of outdoor car parks. A maintained horizontal illumination of 1-2 lm/ft² is recommended with the fittings located so as to light the narrow 'corridors' between lines of parked cars. Incandescent, mercury or fluorescent sources can be used in either streetli9hting or floodlighting equipment. P. P.

628.971.6
878. Use of the conception 'road surface brightness' in street lighting practice.
J. B. DE BOER, *Bull. Assoc. Suisse Elect.*, **51**, 585-595 (*June* 18, 1960). *In German.*

The most important factor in securing visibility in a street at night is the luminance of the surface and the way in which it varies. It is possible to calculate this from a knowledge of the light distribution from the fitting and the reflection characteristics of the surface, particularly for angles of view very close to the horizontal. Measurement of road surface luminance is difficult because of this glancing angle of view and the correspondingly small vertical angle subtended at the observer's eye by a patch of roadway of limited length. The author describes a photo-electric luminance meter with which such measurements can be made. By the use of a multiplier photocell and transistors it is possible to secure adequate sensitivity without undue bulk or weight. J. W. T. W.

879. The lighting of rail vehicles. 628.97
R. BLANCHERIE, *Bull. Soc. Franç. Elect.*, 8th Series, **1** (6), 351-361 (*June*, 1960). *In French.*

A lecture on the history and development of train lighting, including particularly the problems of supply of energy, present-day tendencies, new problems posed by the increased range of speed and by railcars and electric trains. The requirements for electric lamps and fittings, high frequency operation of fluorescent lamps, and brushless generators are described and future developments forecast. J. M. W.

MISCELLANY

Education

THE NORTHAMPTON COLLEGE of Advanced Technology has arranged in association with The Illuminating Engineering Society for a course of six evening lectures on Recent Developments in Lighting Techniques to be given on consecutive Thursday evenings (7–9 p.m.) commencing October 20th. The course is of an advanced nature and is intended for qualified and practising lighting engineers who are anxious to keep abreast of recent work. A good deal of new data has recently been made available and some new and novel techniques have been evolved; this course of lectures presents a good opportunity to review the situation.

The dates and subjects of the lectures are as follows:—

October 20. General introduction and lighting calculations, by Dr C. A. Padgham.

October 27. Interior daylighting—availability and prediction, by Mr P. Petherbridge.

November 3. Lighting quality—glare and adaptation, by Dr R. G. Hopkinson.

November 10. Colour rendering properties of light sources, by Dr B. H. Crawford.

November 17. New lighting design data and glare tables, by Mr W. Robinson.

November 24. Designed appearance lighting by Mr J. M. Waldram.

Each lecture will last for approximately one hour and there will be adequate time for discussion.

Enrolment for the course can be made by personal attendance at the College (St John Street, EC1), or by application for an enrolment form which has to be returned together with the fee (£1 1*s*.) at least one week before the beginning of the course. Employers wishing to submit enrolments on behalf of their staff are requested to obtain cards for each participant.

The amount of work that is now being done under each of the subjects of the various lectures makes this course a very timely one and should be extremely useful in enabling lighting engineers to assess the value of the new techniques. The potential value of this series of lectures is not to be judged by the moderate fee.

A PART-TIME EVENING COURSE leading to the final certificate examinations of the City and Guilds of London Institute in Illumination Engineering has been arranged at Peel Park Technical College, Salford, 5.

THE RESULTS OF THE CITY AND GUILDS of London Institute examinations in Illuminating Engineering held in May were recently announced as follows:

INTERMEDIATE GRADE

First Class: R. G. S. Anderson, R. S. Bright, J. E. Chapman, C. N. Ghandi, G. J. Potter, J. Ludlam-Taylor, F. M. Pigott.

Second Class: P. Egan, P. F. Fox, G. G. Holt, J. B. Richardson, T. P. Sanford, F. T. Connors, P. D. Molumby, S. Littlewood, F. B. Parker Hampton, L. Riley.

FINAL GRADE (Papers 1 and 3)

First Class: R. C. Aldworth, J. Sanderson, R. F. Stimson, K. E. Parsons.

Second Class: R. S. Bright, C. Cuttle, P. J. McCulloch, M. A. Richards, R. A. Richardson, H. S. Sutton, R. E. Allen, R. A. Hall.

FINAL GRADE (Papers 1 and 2)

First Class: A. R. Bean.

Second Class: R. S. Bright, R. C. Aldworth, B. A. Hall, P. J. McCulloch, J. Sanderson, R. F. Stimson.

Personal

R. W. Gregory and Partners, consulting engineers, of Pilgrim Street, Newcastle-upon-Tyne, announce that MR G. P. CUNDALL has been taken into partnership. Mr Cundall joined their Newcastle office in 1955 after gaining industrial, contracts and sales experience with BICC, Metropolitan-Vickers and BTH.

Mr T. Dunwoody announces that MR R. W. CROSS has become a partner in T. Dunwoody and Partners, consulting engineers, of Bruton Lane, W1.

SIR LESLIE GAMAGE, Chairman and Managing Director of the General Electric Co Ltd, is to retire at the end of this year. He relinquishes his executive duties as Managing Director immediately but will continue as Chairman until December 31. Sir Leslie, who joined GEC in 1919, was appointed Vice-Chairman and Joint Managing Director in 1943 and has held his present offices since November 1957, during which time he has been largely concerned with directing the re-organization of the firm.

Industrial Notes

OPTICAL INSTRUMENTS AND TECHNIQUES is the subject of a conference being organized by the British National Committee for Physics under the auspices of the International Commission for Optics. It is to be held next year in London, during the period July 10 to 14. Enquiries should be addressed to K. J. Habell, National Physical Laboratory, Teddington, Middlesex.

THE 'PHANTOM VEHICLE' ACCIDENT on the M1 earlier this year, in which the driver of a car involved in a crash reported that he had swerved to avoid what he thought was a vehicle under a bridge, although it was later found that the 'obstruction' was a shadow, was raised in the House of Commons in July by Mr Hocking in asking the Minister of Transport, Mr Marples, to consider the lighting of areas beneath bridges. Mr Marples replied that he was awaiting a full report on the incident and would then investigate the matter further. The Minister also confirmed that it was not the present intention to light the Birmingham-Preston motorway, apart from the terminal roundabouts.

DIRECTION INDICATORS ON VEHICLES were also discussed in the Commons, the problem being the variation in brightness between different makes of vehicle flashing indicators. Mr Marples reported that good progress was being made, in discussions among European countries, to reach agreement on a standard type of indicator. He was in touch with manufacturers and other interests on the application in this country of standards which compare closely with international recommendations, but he did not propose to make the fitting of direction indicators compulsory at this stage.

IT WAS ANNOUNCED by Mr S. R. Eade, Managing Director of AEI Lamp and Lighting Co Ltd, at the meeting in July of their Regional Managers and Senior Sales and Marketing staff, that the company had been honoured by receiving the Royal Warrant of Appointment as suppliers of electric lamps to HM Queen Elizabeth the Queen Mother.

ANOTHER ROYAL ACKNOWLEDGMENT was announced recently by the General Electric Co Ltd. During the visit to this country of King Phumiphol and Queen Sirikit of Thailand, the company received an order for three gold-plated crystal chandeliers for the Grand Palace, Bangkok. Chosen from the GEC's general catalogue of decorative fittings, each is 11 ft. 6 in. high, more than 6 ft 6 in. in diameter and incorporates 7,800 crystal drops, three gold-plated metal bands and forty-five three-lamp candelabra arms. A further order received on the last day of the visit included sixty-four Georgian period gold-plated chandeliers and 121 floodlighting lanterns.

FROM JULY 8, Manchester has had its own Building Centre. Affiliated to the Building Centre in London, it is intended primarily for architects, builders and others responsible for specifying products and materials for building. The new centre occupies two former cotton warehouses at Portland Street, Manchester, 1, and apart from the display areas, houses an information department, trade magazine library and exhibition rooms for special displays, technical demonstrations and manufacturers' film shows; they are also available to professional organizations for meetings and lectures.

HAVING OUTGROWN ITS NAME, the Witton Molded Insulation Works of the GEC (part of their Engineering Group) is now to be known as the GEC Moulded Plastics Division. The GEC have been moulding plastics at Witton for more than forty years, but products have long since ceased to be restricted to insulation or even the electrical industry. Today moulding is undertaken for a large number of industries in practically the whole range of thermoplastic and thermosetting materials, and in bituminous and hard rubber compounds.

THREE COMPANIES WITHIN the Electrical Division of Tube Investments Ltd—Simplex Electric Co Ltd, Mersey Cable Works Ltd, and The Power Centre Co Ltd—have integrated their industrial sales organization. As from August 1, they have established a unified selling unit operating from twenty-two Simplex branches situated throughout the country. This integration of selling is intended to benefit all customers —commercially and technically—in providing rapid service and personal attention. Specialist staff will be located at each company's head office to attend to direct technical enquiries or non-listed special products or services.

TO HANDLE ENQUIRIES for special timing or control equipment, and for special-purpose control panels, required for lighting installations, Equipment and Services Ltd, Bush House, Bush Fair, Harlow, are creating a Special Products Division. It is to be housed in their new factory premises at Harlow.

Overseas News

THE AMERICAN IES have just published two new documents recommending lighting practices for ships and parking areas, respectively. The former, 'Recommended practice for marine lighting' prescribes lighting for larger passenger and cargo vessels for all purposes apart from signalling. The latter 'Recommended practice for outdoor parking area lighting' details equipment and pole spacing and mounting heights, together with a discussion of minimum illumination requirements, colour, economics and recommended maintenance. Both publications are available from the Society's Publication Office, 1860 Broadway, New York 23, NY, at 50 cents (approximately 3*s*. 6*d*.) each.

LATEST NEWS FROM Sylvania Electric Products is their development of a 'natural white' fluorescent lamp having a higher red component in its spectral distribution. Like its counterparts in the UK, it is designed for installation in food stores, restaurants, and for the lighting of clothes, furnishing materials and cosmetics. The lamps are being made in ratings from 15 W to 73 W in the usual methods of starting. Another fluorescent development reported from Sylvania recently is that of a street-lighting lantern with an optical system suitably designed for VHO reflector lamps. As can be expected, the surface luminance of the flashed area is particularly high: a level of 22,000 ft-L has been stated. For this reason, it is suggested as suitable for use as a vehicle headlight, mounted on the grille of a car between conventional headlamps. Optical control is said to be sufficiently accurate to give vertical cut-off whilst maintaining adequate lateral distribution to illuminate pedestrians on the pavement. As a street-lighting unit, the new lantern is envisaged as being mounted parallel to the road axis on 3 ft columns, the optical control again eliminating any light above the horizontal.

TWO NEW TYPES of airport runway lighting have been installed at New York International Airport (Idlewild), one for landing approach and the other to mark turn-offs into taxiways. Both systems are embedded in the runway, being designed to withstand weight and impact of the heaviest commercial airliners.

For landing approach, the 'narrow gauge' system is installed, so called from the railways track appearance it presents to incoming pilots. It comprises two rows of weatherproof PAR fittings, housed in heavy steel fixtures which form part of the runway surface. After the first 3,000 ft, the double line becomes a single line down the centre of the runway. Each fitting houses a small-bulb 100 W filament lamp whose power can be varied from the airport control tower according to weather conditions.

Particularly novel, however, is the taxiway turn-off lighting, which is of 2½ in. long, 45 W tubular quartz filament lamps and may thus be one of the first commercial applications of this type of light source. The lamps incorporate iodine to inhibit tungsten evaporation. They are mounted in circular cast-iron fixtures cemented into the taxiway surface at 20 ft intervals down the centre of each turn-off.

THE FIRST TWO DAYS of the Berlin 'Building Weeks', arranged for the period September 15 to October 2, are to be devoted to meetings dealing with lighting in and for building. On the first morning there are to be two papers by architects, one on 'Light as a constructional element in building' and the other on 'Light and architecture, as exemplified in modern German buildings'. In the afternoon Dr Köhler will discuss yet again the familiar theme of collaboration between architects and lighting engineers. On the morning of the second day there is to be a paper on permanent supplementary artificial lighting, with special reference to factories and schools, and another on subjective aspects of colour. In the afternoon the theory and practice of 'building with light' form the subject of a paper by yet a third architect. Technical visits have been arranged for the late afternoons and on the first evening there will be a tour of installations with notable lighting features. The registration fee is the modest one of 6 DM (about 10*s*.) and further information can be obtained by writing to 'Das Licht im und am Bau', c/o BEWAG, Münstersche Str. 5/6, Berlin-Wilmersdorf before September 9.

The new capital city of Brazil, Brasilia, is to have fluorescent streetlighting, making use of 'Powergroove' lamps, of which nearly 10,000 are to be supplied for an installation of twin-lamp lanterns. This equipment, which was ordered over the signature of Brazil's President Kubitschek, was selected for its high lumen output: the two 6ft lamps in each lantern provide nearly 22,000 lm.

Situations

Vacant

LIGHTING. Required for lighting promotion, staff with imagination, personality, ability to write technical copy, and an aptitude for public speaking. Based in London, the successful applicants will be expected at times to travel the country. Salary according to experience and qualifications. Contributory superannuation scheme. Applications to The British Lighting Council, Brettenham House, 16-18 Lancaster Place, London, WC2.

REVO ELECTRIC CO LTD require an ASSISTANT aged 20/30 for their London office, handling industrial and domestic products. This assistant will be concerned primarily with the co-ordination of lighting activities and the post offers good opportunities to the right man. Pension scheme. Apply giving details of qualifications and experience to Manager, Southern Region, 30–31 Great Queen Street, London, WC2.

REVO ELECTRIC CO LTD require a first class REPRESENTATIVE for the Central London Area for the sale of industrial products including new ranges of lighting equipment. Previous experience in the lighting industry and a good sales record essential. Car provided. Pension scheme. Apply in confidence giving details of qualifications and experience to Manager, Southern Region, 30–31 Great Queen Street, London, WC2.

LIGHTING DESIGN ENGINEER. Philips Electrical Ltd require an engineer for planning a wide variety of lighting schemes. Some knowledge of this work is necessary, but the post will give the opportunity to gain further training and experience in this field. This is a pensionable post with progressive conditions of employment. Please write with all details to the Employment Officer, Century House, Shaftesbury Avenue, London WC2, quoting ref. 463.

ELECTRICAL LIGHTING ENGINEER required with experience of design and production. Paddington area. Box No. 716

Postscript

SEPTEMBER IS THE MONTH when seaside 'illuminations' really have a good 'innings'. With the holiday still in progress but the shades of night falling earlier and earlier, the gaiety of the lights becomes earlier in onset and longer in duration. There is something magical about these multi-coloured 'flowers' of the night, and it is not to juvenile eyes alone that they are enchanting. And this reminds me of a recent letter to *The Times* from the matron of Chailey Heritage—a Sussex craft school and hospital for physically handicapped children—pointing out that some such children may never see the lights of London, Brighton or Blackpool on festive occasions. But this letter was really evoked by other correspondence suggesting that this year's glow-worms are super-bright! The matron reports that during the summer of Coronation year, glow-worms were prolific and brilliant in the neighbourhood of Chailey. Many were collected and arranged on a grassy bank to form the letters ER and the 'lighting up of the glow-worms each night was an enchanting experience for some of the older physically handicapped children at the Heritage'. Well done glow-worms!

SOME OF THE ILLUSTRATIONS in last month's *Light and Lighting*, and many that have appeared in previous issues, cannot fail to keep us in mind of the fact that lighting remains an 'art' no matter how much 'science' underlies it. Of course this is most evident in fields of application where the dominant purpose of lighting is not the revelation of environmental things that we need to do something with or about, but is that of gratifying the sight with pleasant effects of light and shade and colour and with the transfiguration of mundane things. Thus, lighting can never be comprehensively 'codified' any more than painting can be, or musical composition. There are, however, some basic rules of practice, some guides and recommendations, that can be—and are—embodied in lighting codes, of which one of the best known and most widely used is that issued by our own Society. A new and completely revised version of this Code is in course of preparation and I understand that publication of it will be made during the coming session.

ANOTHER REMINDER of the artistic character of lighting was provided by the publicity given last month to the new liner *Windsor Castle* on her maiden voyage. No one will doubt the generosity with which lighting has been used in the interior decoration but there will be less general agreement on the artistry behind its use. To judge from the pictures I have seen, many of the lighting ideas have come straight from the 1920's and 1930's, whilst the thought of 'traditional' Victorian street lights standing sentinel at an interior smoking room entrance is one to bring a smile to the lips of many modern designers. Surely there are more than enough mid-century lighting ideas which could have been used to display British quality and artistry without having to rely on 30-year-old thinking?

THE IES HAS HAD THREE PRESIDENTS who have been Fellows of the Royal Society and so have attained the highest distinction in the world of science that this country has to offer. The first president of the IES—Prof Silvanus P. Thomson—was one of these three, the others being Sir John Herbert Parsons, the celebrated ophthalmologist, and Sir Clifford Paterson whose memory is honoured by the Trotter-Paterson Memorial Lecture. Now a fourth FRS, in the person of Dr W. S. Stiles, is about to take office as president. So, having entered upon its first fifty years under the leadership of one of these elect men of science, the Society begins its second half-century under the leadership of another. This is a happy augury. Whether he knows it or not, Dr Stiles and I have been acquainted for more than a quarter of a century and, as I am one of those who hold him in high esteem both as a scientist and as a man, I am quite sure that when he takes office next month he will add lustre to the presidency during his tenure of it.

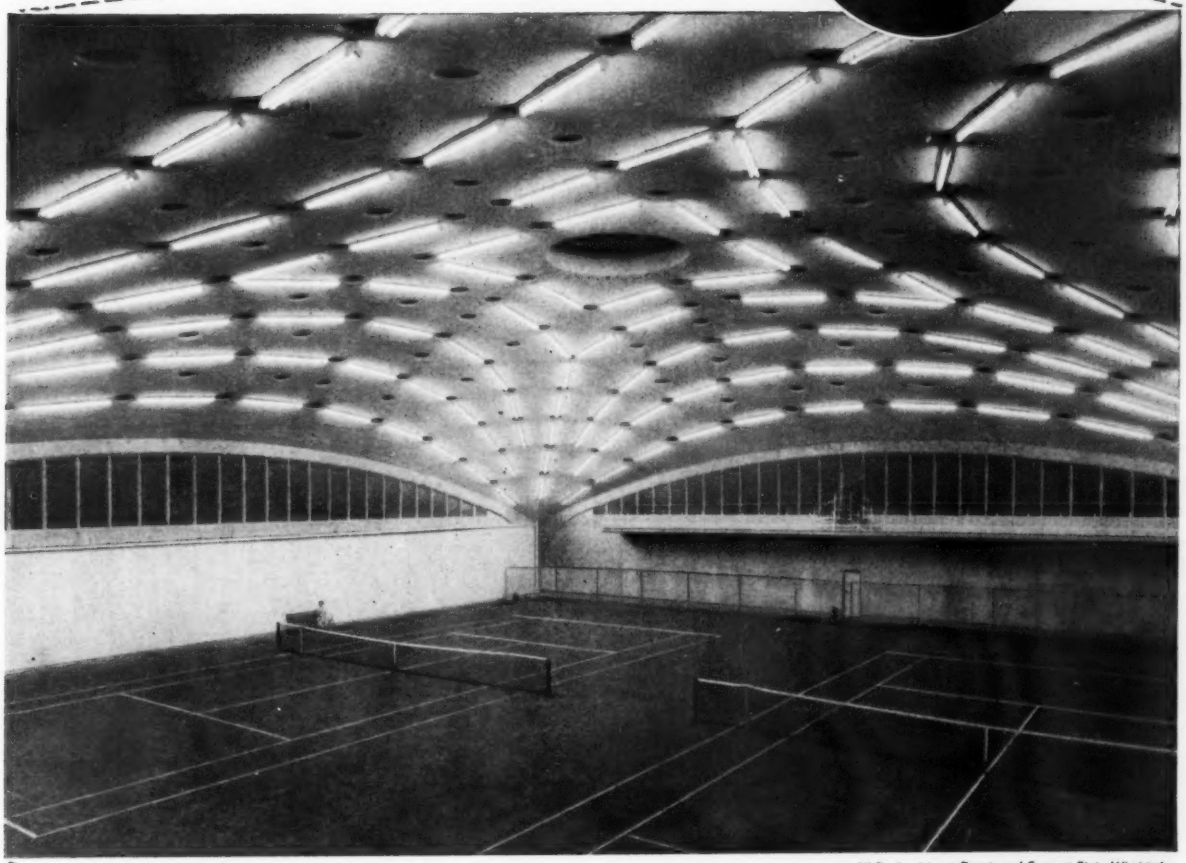
NOW THAT THE EXAMINATION SEASON is over the usual crop of 'howlers' has been harvested. What a small slip—no more than the omission of a single letter—can make a howler! Here is one from the current crop: 'All first year dying students are checked for colour vision.' They may, of course, soon be faced with the choice of celestial blue or hell-fire red but there will be other indications of their destination *en route*! A more verbose example is: 'The lamp interior of the tube is at 1/100 of an atmosphere and this change in pressure through which the light passes when going out of the lamp in conjunction with the properties of the fluorescent coating and its ability to lengthen wavelength and internally reflect the ultra-violet radiation and absorb this radiation prevents the transmission of the ultra-violet rays.'

IN SPITE OF THE WIDESPREAD 'improvement' in the lighting of offices which has occurred in recent years—due largely to the availability of very efficient light sources—it is claimed by a new marketer of lighting equipment that eye-strain is a constant hazard of modern business life. Its cause is said to be insufficient desk lighting, although a certain rival vendor of lighting equipment is untiring in proclaiming its cause to be excessive lighting! Both are right in so far as the uncomfortable symptoms of what is popularly called 'eye-strain' can arise from trying to see effectively with either inadequate or excessive 'lighting' but, paradoxically, what one regards as inadequate is what the other declares to be excessive! Both assert that eye-strain is annually responsible for hundreds of cases of defective sight but neither has any factual evidence of this. I do not under-rate the importance of avoiding eye-strain but, while it is unpleasant enough and very undesirable, it is not known to cause normal sight to become irreversibly defective. The new equipment that is to remove the constant hazard of eye-strain from business life appears to be a fluorescent lamp built into a letter tray unit which fits on top of the desk. There is, of course, plenty of scope for built-in lighting associated with desks of different sorts and with machines. The idea is hardly 'revolutionary' as the letter-tray-cum-'strip lighting' merchant claims, but the trend of practice nowadays is towards good general lighting rather than towards general plus local lighting, although the latter is sometimes best.

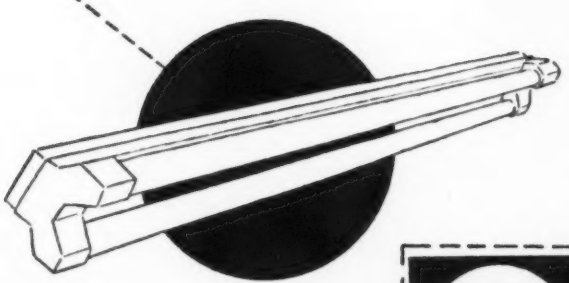
'Lumeritas'

WHATEVER YOUR BUSINESS...

PHILIPS PUT IT IN A BETTER LIGHT



All England Lawn Tennis and Croquet Club, Wimbledon.



Planned lighting is more attractive, easier on the eyes, and far superior when it comes to any form of display.

For the most effective planned lighting, simply get in touch with Philips Lighting Design Service. This famous service offers you the advice of a team of expert lighting engineers and of a fully qualified architect, and can provide you with individual recommendations on the exact lighting for any purpose.

Set the wheels in motion now: post the attached coupon to Philips.

PHILIPS

Please send me full details of your
LIGHTING DESIGN SERVICE
Philips Electrical Ltd., Lamp and Lighting Group,
Century House, Shaftesbury Avenue, London, W.C.2

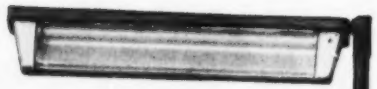
NAME.....

ADDRESS .....

[LL.3]

PHILIPS LIGHTING DESIGN SERVICE

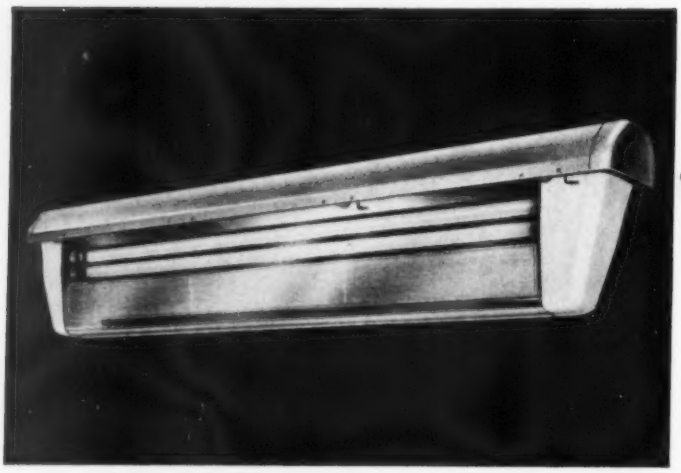
G.E.C. THREE-EIGHTY LANTERN



specially designed for main road lighting

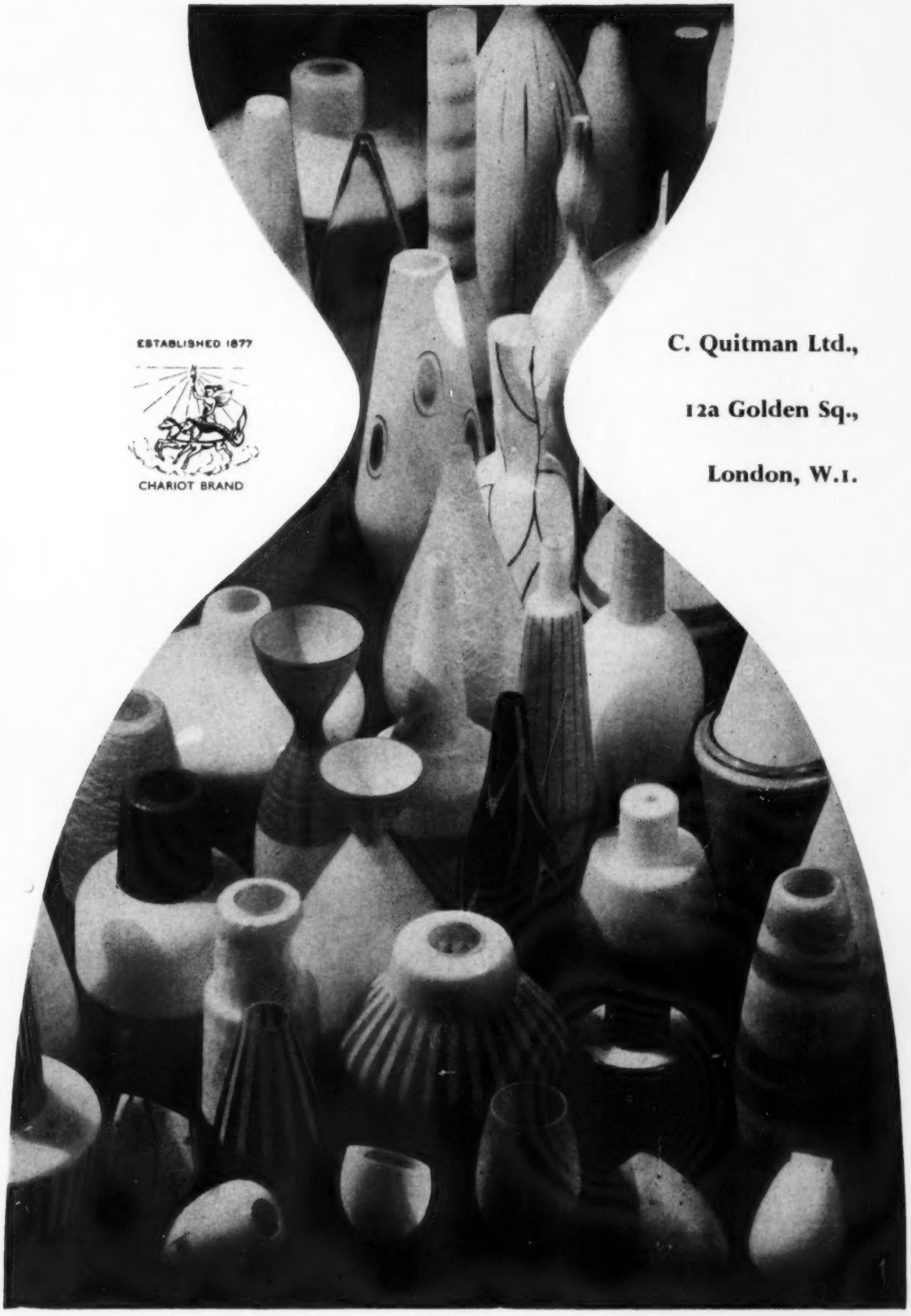
Slim and highly efficient, this is the lantern for main roads, civic and shopping centres, promenades and wherever good lighting and good looks are essential. The G.E.C. "Three-Eighty" Lantern is non-corrodible, is made of lightweight alloy extrusion, and castings and the "Perspex" refractor plates are bonded to the inside of the "Perspex" bowl. The lighting is by three 80 w. 5 ft. Osram guaranteed fluorescent tubes operated by G.E.C. trouble-free, quality control gear.

Send for full details or, better still, let Britain's leading lighting designers work with you right from the initial planning stage to the "switch on".



G.E.C.
LIGHTING DIVISION

The General Electric Co. Ltd., Magnet House, Kingsway, London, WC2



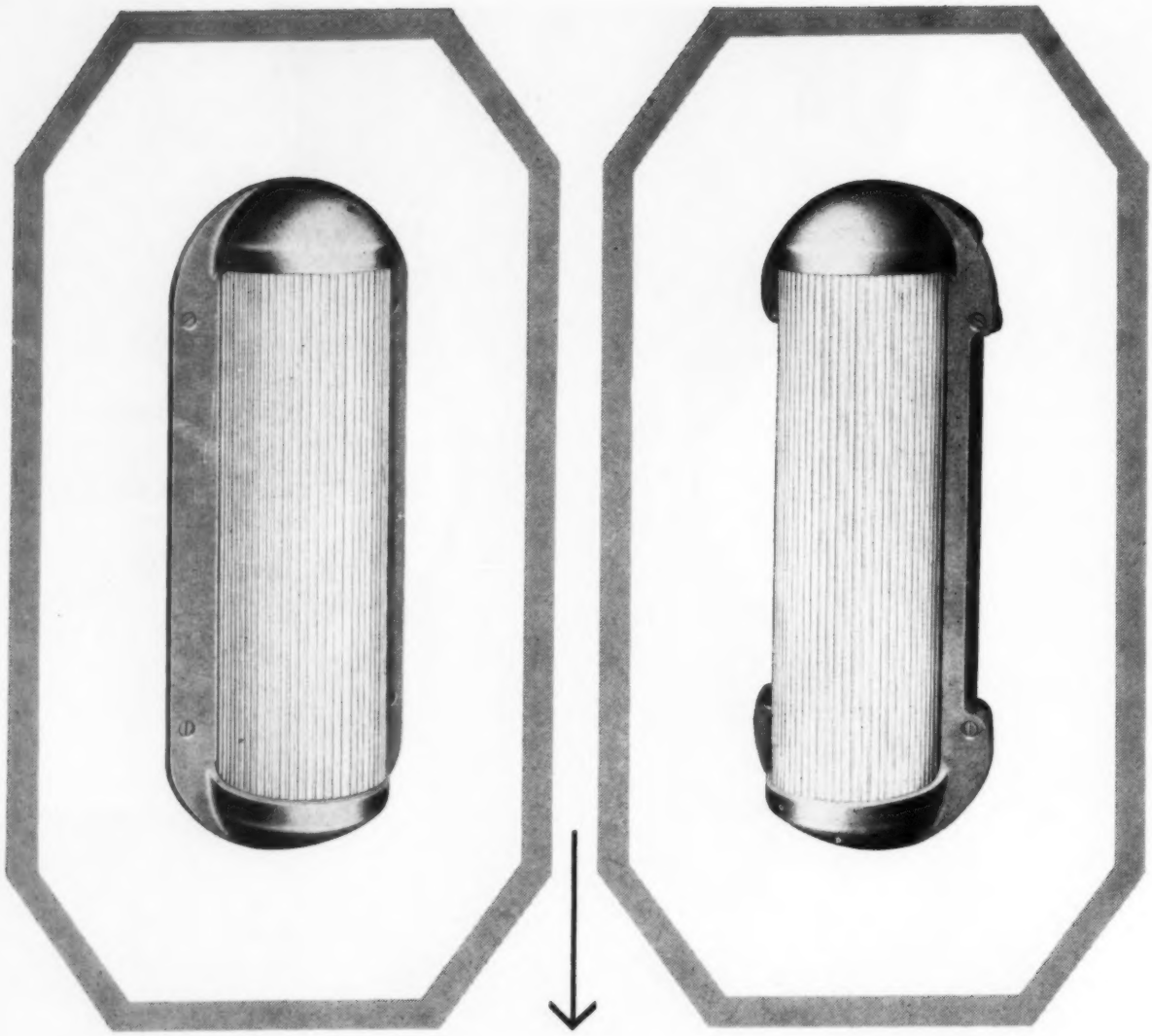
ESTABLISHED 1877

CHARIOT BRAND

C. Quitman Ltd.,

12a Golden Sq.,

London, W.1.



WARDLE *fluorescent bulkhead fittings*

Available as a recessed or non-recessed unit, this Wardle directional lighting fitting provides continuous low cost lighting with minimum maintenance.

DESIGN FEATURES INCLUDE . . .

- ★ Two or three 8 watt 12″ fluorescent tubes
- ★ Lamp life over 5,000 hours
- ★ Built-in control gear
- ★ Fluted glass or Perspex in detachable front cover
- ★ Corrosion resistant aluminium alloy body
- ★ Choice of 5 inlet positions
- ★ Shaped for normal, tilted or corner mounting
- ★ Completely weatherproof
- ★ Hammered silver finish

Send for leaflet L601/M

THE WARDLE ENGINEERING CO. LTD.

OLD TRAFFORD MANCHESTER 16. *Telephone: TRAfford Park 1801 (3 lines)*
London Office: 34 Victoria Street, S.W.1. Telephone: ABBey 4072 and 1356

W39158

Mr. CAPACITOR LIGHTS THE WAY AHEAD

with a

NEW RANGE

of

STREET LIGHTING CAPACITORS

TMC

These capacitors measure up to the most stringent performance needs and reinforce Mr. Capacitor's claim to being your most reliable capacitor man.

- ✻ Specially processed mineral and synthetic impregnants are used in association with low loss Kraft tissue and pure aluminium foil.
- ✻ Designed to meet modern requirements efficiently.
- ✻ Competitively priced.
- ✻ Supplied with fixing brackets (convenient for column or lantern mounting), alternatively without brackets.
- ✻ 9″ leads and shrouds standard, can be supplied with alternative leads and without shrouds if required.
- ✻ Fitted with discharge resistor.
- ✻ Earthing terminal on bracket if required.
- ✻ Width of slot in bracket ¼″. Nominal fixing centres 3¼″.

Power Factor Correction Capacitors
Street Lighting Types 275 V.A.C. MAX.

Type OR (—40 to + 60°C.)
Welded Aluminium Cased, Elastomer Sealed

Capacitance & Tolerance	Dims. in Inches		Catalogue No.
	Case Length	Cross Section	
8μF ± 10%	5½	2½ x 1¹⁵⁄₁₆	OR 117384
10μF ± 10%	4½	3 x 2	OR 117336
13μF ± 10%	5⅞	3 x 2	OR 117337
15μF ± 10%	5½	3 x 2	OR 117338
18μF ± 10%	6½	3 x 2	OR 117339
20μF ± 10%	7½	3 x 2	OR 117340

Type AR (—5 to + 60°C.)
Welded Aluminium Cased, Elastomer Sealed

8μF ± 10%	4	2½ x 1¹⁵⁄₁₆	AR 130043
10μF ± 10%	3	3 x 2	AR 130044
13μF ± 10%	3½	3 x 2	AR 130045
15μF ± 10%	4½	3 x 2	AR 130046
18μF ± 10%	5⅞	3 x 2	AR 130047
20μF ± 10%	5½	3 x 2	AR 130048
25μF ± 10%	6½	3 x 2	AR 130049

Type HB (—25 to + 60°C.)
Aluminium Cased, Elastomer Sealed

8μF ± 10%	2½	2½ x 1⅞	HB 117383
10μF ± 10%	3½	3 x 2	HB 117330
13μF ± 10%	3½	3 x 2	HB 117331
15μF ± 10%	4½	3 x 2	HB 117332
18μF ± 10%	4½	3 x 2	HB 117333
20μF ± 10%	5⅞	3 x 2	HB 117334
25μF ± 10%	6½	3 x 2	HB 117335

Further information from:

TELEPHONE MANUFACTURING COMPANY LIMITED
Components Division · Cray Works · Sevenoaks Way · Orpington · Kent
Telephone: Orpington 26611

STAND No. 24
A.P.L.E. CONFERENCE

TMC

FILDENEX

unbreakable LAMPSHADES

11" & 13" dia. Available complete with suspensions or as replacements—will fit standard 4¼" monkscaps or B.C. lampholder shade rings (with special shade carrier).

Illustration shows a
LONDON SCHOOL MODERNIZATION SCHEME.

FILDENEX
H. W. FIELD & SON LTD
HAROLD WOOD - ESSEX
Tel. INGREBOURNE 41144

TRANSTAR

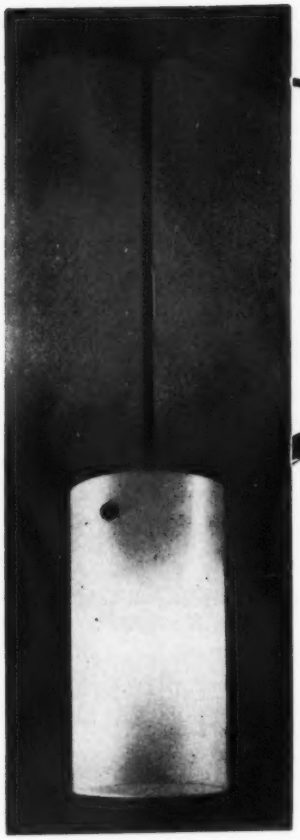
LIGHTING CONTROL UNITS

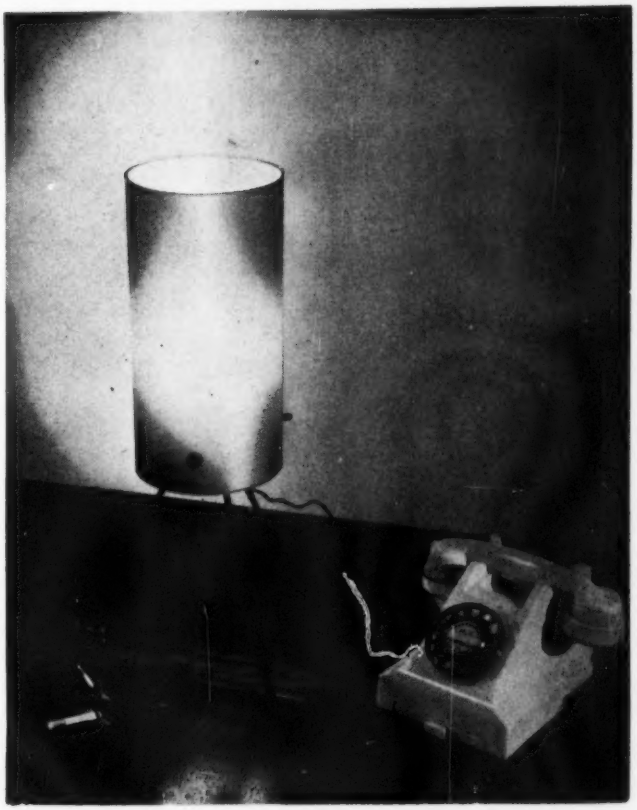
PIONEER OF ALL
SELF-CONTAINED
INSTANT-START
BALLASTS

DESIGNED
TO ENSURE
FULL LAMP LIFE
HIGH LUMEN OUTPUT
SILENT OPERATION

FITTED WITH HIGH-TEMPERATURE RESISTING CAPACITORS
AND
GUARANTEED FOR 3 YEARS

Sole Manufacturers
INDUCTIVE APPLIANCES LTD., ST. NICHOLAS ST., NEWCASTLE - UPON - TYNE 1
Tel. Newcastle 27069 Works Tel. Hebburn 832221





This new Cylinder pendant fitting and Table Lamp has now been added to the Hailwood range, and is suitable for both domestic and commercial use. The glassware can be supplied in 3 ply opal, satin opal or green and white.

HAILWOOD & ACKROYD LTD.

18 LOWNDES STREET · LONDON · S.W.1

Telephone: Sloane 0471

ADASTRA

LIGHTING COLUMNS

In steel or aluminium, of one piece construction or sectional, Adastra lighting columns are designed to suit any location. The sectional columns nest within the base section so that handling, storage and transport costs are kept to the minimum. This is of particular interest where mounting heights exceed 25 feet. A further advantage of steel poles is the hot dip galvanized finish which gives greatly increased durability.

Beta one column 11 ft. mounting height

Adastra columns for 35 ft. mounting height

(Photograph of 35 ft. mounting height columns by courtesy of Granville Berry, Esq., M.I.C.E., M.I.Mun.E., Coventry City Engineer and Surveyor)

See us on STAND No. 25 at the A.P.L.E. Exhibition and also visit our outside display of columns, and actual installations are erected outside on the display ground

POLES LTD (K)

TYBURN ROAD, ERDINGTON, BIRMINGHAM 24
Phone: ERDington 1616 Grams: "Poles Birmingham"
LONDON OFFICE 98 Park Lane, W.1. and 'phone MAYfair 3074
CONSTRUCTORS GROUP

R 52

INDEX TO ADVERTISERS

	Page
A.E.I. Lamp and Lighting Co. Ltd.	iii
Atlas Lighting Ltd.	xiii
Benjamin Electric Ltd.	247
Concrete Utilities Ltd.	xiv
J. and G. Coughtrie Ltd.	x
Courtney, Pope (Electrical) Ltd.	v
Crompton Parkinson Ltd.	xi
Cryselco Ltd.	vi
Richard Daleman Ltd.	ii
H. W. Field and Son Ltd.	xx
General Electric Co. Ltd.	vii, xvi
Gowshall Ltd.	iv
Hailwood and Ackroyd Ltd.	xxi
Harris and Sheldon (Electrical) Ltd.	ix
Holophane Ltd.	cover iv
Horstmann Gear Co. Ltd.	xii
Imperial Chemical Industries Ltd (Plastics Division)	cover iii
Inductive Appliances Ltd.	xx
Lumitron Ltd.	iv
Major Equipment Co. Ltd.	viii
Philips Electrical Ltd.	xv
Phosco Ltd.	viii
Poles Ltd.	xxii
C. Quitman Ltd.	xvii
S.L.R. Electric Ltd.	ii
Stanton Ironworks Co. Ltd.	cover ii
Strand Electric and Engineering Co. Ltd.	i
Telephone Manufacturing Co. Ltd.	xix
Wardle Engineering Co. Ltd.	xviii

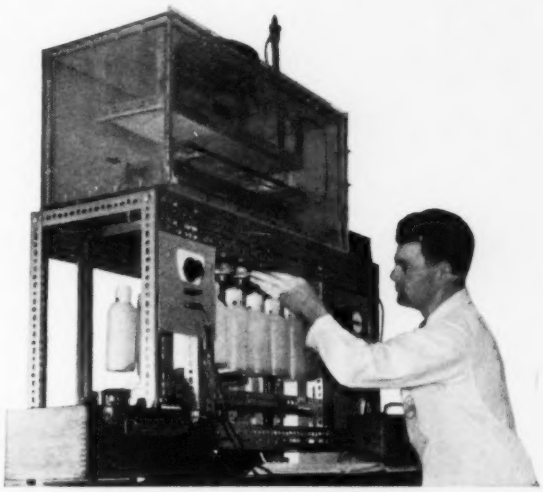
I.C.I. PLASTICS FOR MODERN LIGHTING

'Perspex' acrylic sheet for modular ceiling lighting fittings

Modular fittings with opal 'Perspex' diffusers meet the lighting requirements of modern office blocks with low ceiling heights. The diffusing covers of modular fittings are often large and must be designed so that they do not sag. Studies on the "creep" properties of 'Perspex' provide the necessary data to ensure trouble-free operation over very many years.

'PERSPEX'

'Perspex' is the registered trade mark for the acrylic sheet manufactured by I.C.I.

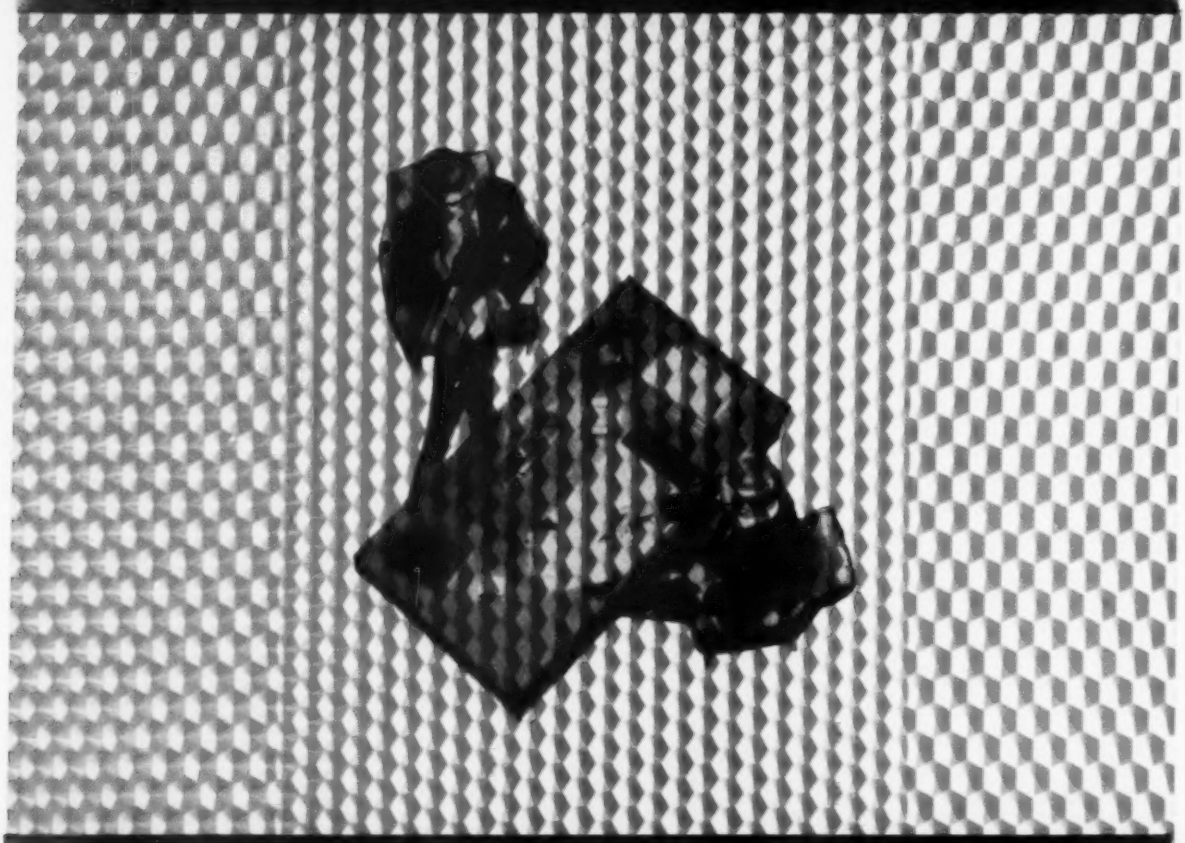


Equipment used at the T.S. & D. Department, I.C.I. Plastics Division, to measure the "creep" characteristics of 'Perspex' acrylic sheet.

Modular ceiling lighting fittings with opal 'Perspex' diffusing panels made by The General Electric Company Limited, installed in the Midland Bank Ltd., High Holborn.

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1
1974

IF FLUORESCENT TUBES COULD ONLY SEE . . .



they might find themselves peering down through this while their progeny, the little lumens, become white with heat. For confinement to precise lines of conduct is enough to make any lumen glow.
Holophane, through their scientific systems of prismatic control, bring to fluorescent lighting a unique approach, where brightness is controlled and high utilization of light sources is achieved. Light is where you want it—on the working plane—and not in the eyes. Write for latest Holophane lighting catalogues, without obligation.

HOLOPHANE

SCIENTIFICALLY CONTROLLED LIGHTING

HOLOPHANE LIMITED ELVERTON STREET
WESTMINSTER LONDON S.W.1. Phone: VICtoria 8062